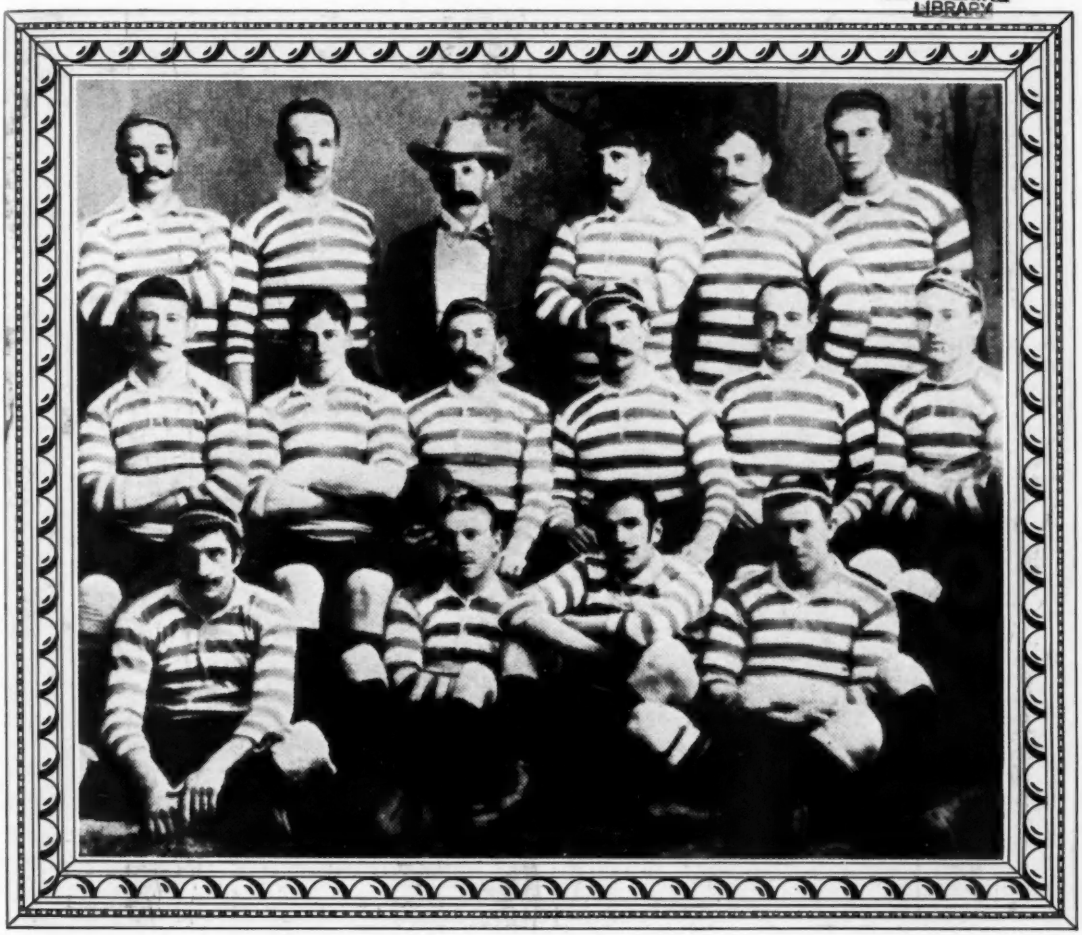
Gas Journal

VOL. 301. 112th YEAR. LONDON, FEBRUARY 24, 1960. No. 5934. PRICE 1/6

THE UNIVERSITY OF MICHIGAN
MAR 21 1960
ENGINEERING LIBRARY



15 good men

Just think that today one good man can apply one coat of Bitugel which is equal to 15 of ordinary bitumen paint. Bitugel is thixotropic with no embrittlement at low temperatures and no plastic flow from heat. When you need a heavy duty anti-corrosive you don't need a rugger team you need Bitugel.

BITUGEL HEAVY DUTY ANTI-CORROSIVE

A PRODUCT OF EVODE OF STAFFORD

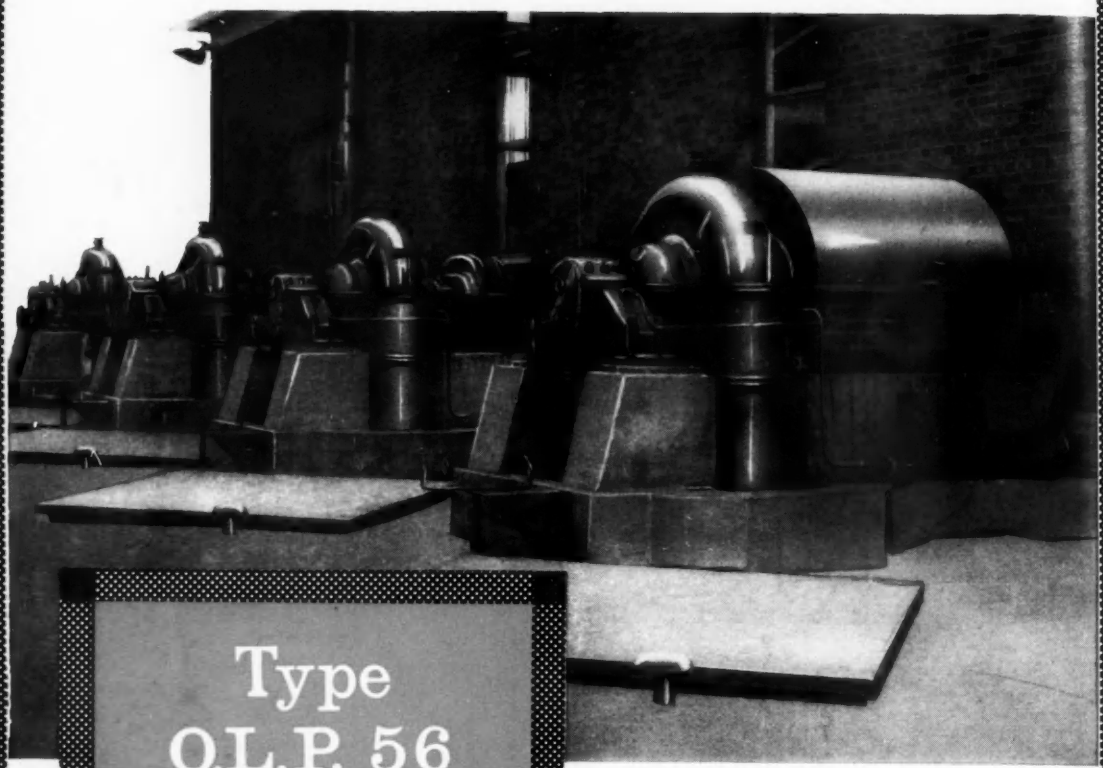
EVOKOTE · EVODYNE · EVO-LED

SEND FOR LITERATURE EVODE LTD., (PAINTS DIVISION) STAFFORD. Telephone: 2241 (5 lines)

London Office: 82 VICTORIA STREET, S.W.1. Telephone: ABBey 4622 (3 lines)

* Are you using the EVODE PERSONAL SERVICE TO DESIGNERS? Write or phone our London Office for details.

progress with
Donkin Gas Boosters



Type O.L.P. 56

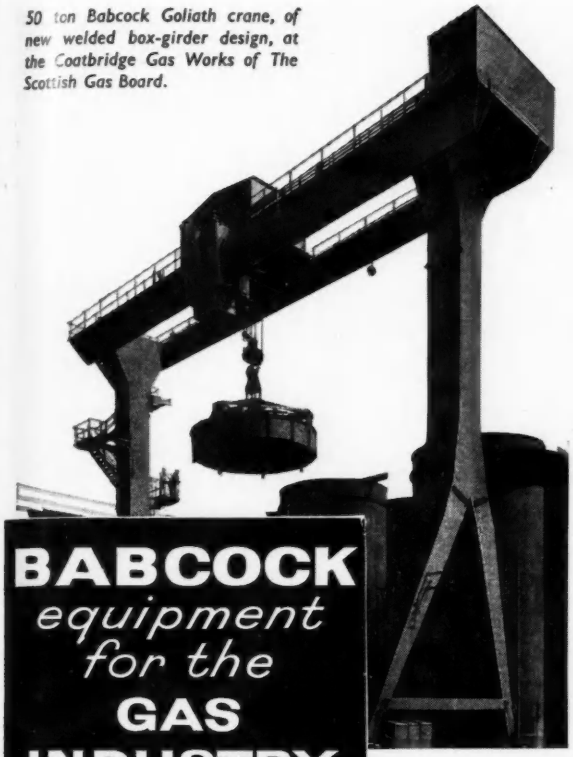
Four Donkin Type OLP.56 Gas Boosters recently installed at the Old Kent Road Works of the South Eastern Gas Board

Two of the Boosters are driven by 300 H.P. L.D.C. Nevelin "Varionic" speed controlled Motors, through speed increasing gears, and two by "Ruston Paxman" 8 cylinder Oil Engines through speed increasing gears and centrifugal clutches. The Boosters incorporate weatherproof features for operation in the open air. The duty of each machine is 350,000/500,000 cu. ft./hr. against a pressure of 1 to 5 p.s.i.g.

The BRYAN DONKIN Co.Ltd.

THE BRYAN DONKIN COMPANY LIMITED, CHESTERFIELD

50 ton Babcock Goliath crane, of new welded box-girder design, at the Coatbridge Gas Works of The Scottish Gas Board.

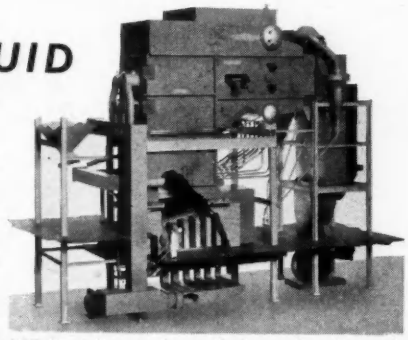


BABCOCK *equipment for the* **GAS INDUSTRY**

The Babcock organization is versatile in meeting the requirements of the gas industry for efficient steam-generation from any kind of fuel or from "waste-heat", and for a wide variety of mechanical equipment used in processing, storage, conveying and handling.

IGNAFLUID FIRING

Important new, efficient method of boiler firing with very fine, low-grade fuels, including coke-breeze dust. Sectional view (from a model) shows Babcock gas or coal fired Bi-drum boiler (45,000 lb./hr.) with IGNAFLUID stoker to burn fuel passing ¼" mesh (Scottish Gas Board, Lurgi gasification plant, Wes.field, Fife)



COMPLETE BOILER PLANT FOR FIRING WITH COAL, COKE-BREEZE, OIL, GAS ETC., WASTE-HEAT BOILERS. WELDED PRESSURE-VESSELS. HEAT EXCHANGERS. MATERIALS-HANDLING PLANT. ALL TYPES OF CRANES. HIGH-PRESSURE PIPEWORK FOR GAS PLANTS

BABCOCK & WILCOX LTD. BABCOCK HOUSE, 209 EUSTON RD, LONDON, N.W.1.

Gas Journal

VOLUME 301 • NUMBER 5034 • 112TH YEAR

WEDNESDAY, FEBRUARY 24, 1960

CONTENTS

EDITORIAL COMMENT

A Fuel Revolution in Canada - 309
Reconstruction at Scunthorpe - 310
Clean and Decent - 311
Link-up with London - 311

SPECIAL ARTICLE

New Canadian Gas Telemetering System - 315

NEWS SUPPLEMENT

Gas Industry Forecasts Demand Will Rise 9% - 327
Fridge Figures Show No Signs of Freezing Up - 327
Pipes Exhibition Sponsors Double Stand Space - 327
Gas Board's Assault on Vehicle Fumes - 328
Ethylene Plant for Iron Curtain Country - 328
Council Postpone Health Plan After Residents Warn 328
Central Heating Apathy - 329
Britain's First Fully-continuous Benzole Fractionation Unit - 329
Built-in Cookers Plea Fails - 329
Scale Models Aid Tar Oils Plant Construction - 330
Wiggin Will Show Nickel Alloy Uses - 330
Sewage Engineers Bought by Woodall-Duckham - 330
Personal Notes - 331
Obituary - 331
Coming Events - 331

TECHNICAL RECORD

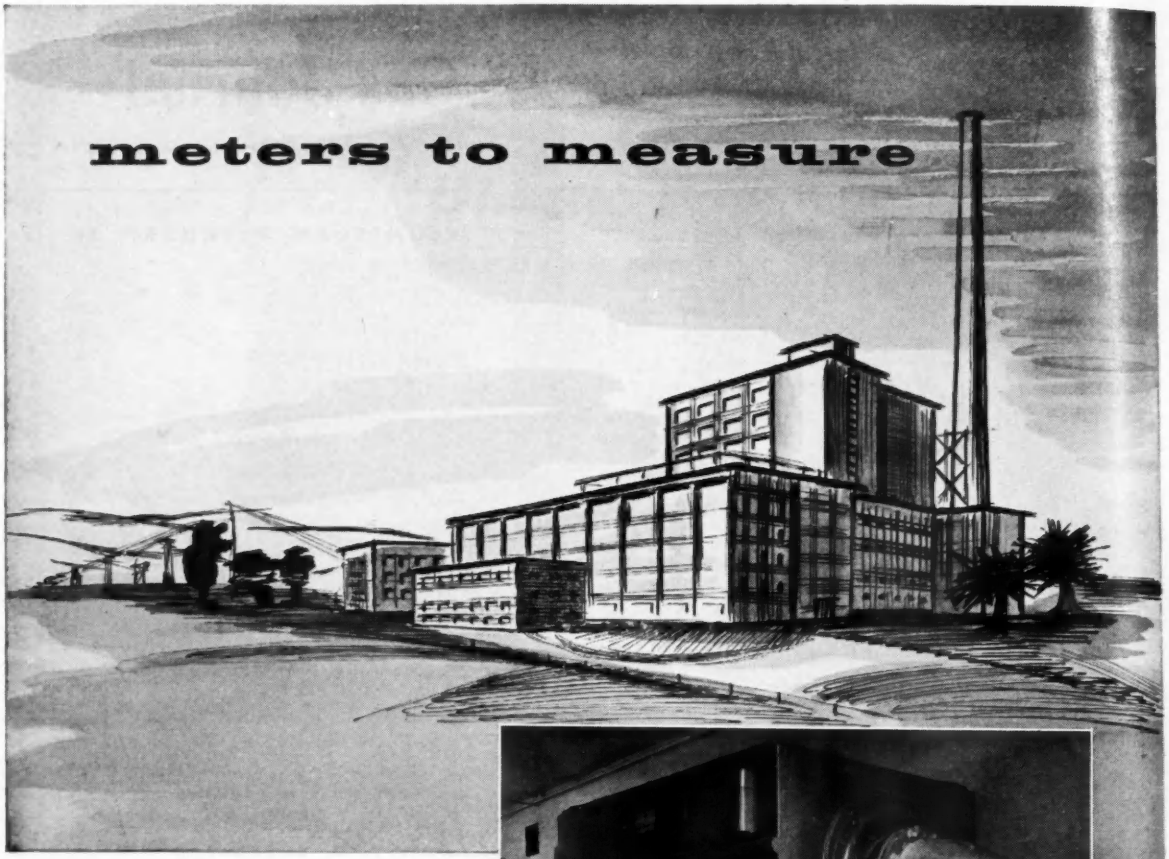
Fuel Technology in Canada. By A. Ignatieff - 312
The Fifties at Scunthorpe. By S. H. Stokes - 316
Gas on the Continent - 326

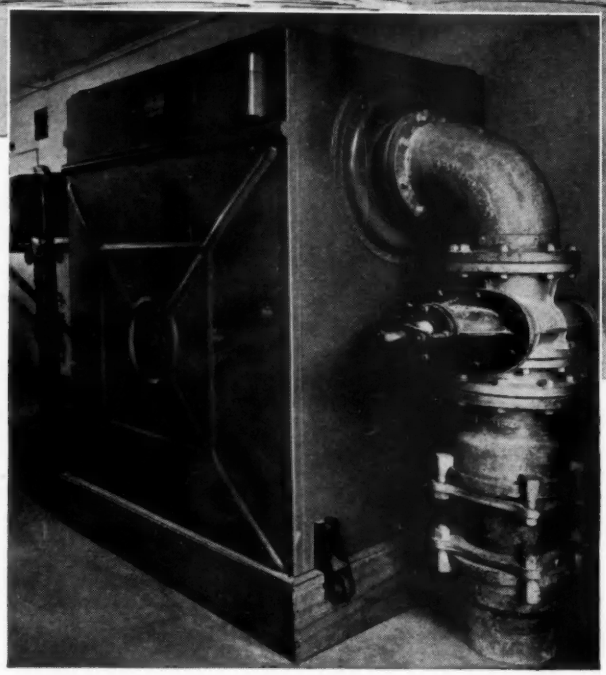
Editor:
GEOFFREY W. BATTISON

Assistant Editor:
COLIN J. GODBOLD

Technical Editor:
CHARLES J. P. DE WINTON, T.D., M.A., M.Inst.Gas E., M.Inst.F.

PUBLISHERS' NOTICE, SEE PAGE 251, FEBRUARY 10, 1960





for any industrial requirement

Britain's industries use gas extensively, and wherever gas is used there's a gas meter . . . and it's likely to be a Thomas Glover meter. T.G.'s have supplied meters for all types of industrial establishments. We are specialists in the manufacture of meters for special requirements, and pride ourselves on being able to supply any capacity required—size is no obstacle. Why not consult us about your industrial requirements? You'll get the meter you want and you'll get it on time. You'll be satisfied with the T.G. service and the finished article. The T.G. Industrial Meter is a "tailor made" product of true craftsmanship, renowned for its accuracy in measurement.

THOMAS GLOVER & CO. LTD.

Registered Office: 48 Grosvenor Gardens, S.W.1

also at

Belfast, Edinburgh, Bristol, Dublin, Edmonton, Gateshead, Manchester and Oldham

TG30A

Gas Journal

COKE OVENS • BY-PRODUCTS • CHEMICALS

A fuel revolution in Canada

CHANGES in the type of fuel consumed since the war are perhaps more marked in Canada than in almost any other country. The discovery of oil and natural gas—the fluid fuels—in large quantities in 1947 and the exploitation of the Leduc oilfield in Alberta, has ushered in a completely new era in Canadian fuel demands. Up till 1951 there had been a reasonably steady demand for coal which was on the whole showing a tendency to rise but since 1951 the radical changes that took place cut the coal consumption by nearly half within seven years.

The size of the Dominion makes it hard for many in Europe to understand some of the difficulties which must be overcome before the country's mineral resources can be exploited to the best advantage, but a paper read recently to the Institute of Fuel by Mr. A. Ignatieff, Chief, Fuel Division, Mines Branch, of the Department of Mines and Technical Surveys, Ottawa, goes a long way towards making such problems clearer.

We are publishing an abstract of this paper in our issue this week, but we feel that the original title (which we have retained), 'Fuel Technology in Canada,' is slightly misleading and does not really do justice to the content of the paper as a whole. It does not confine itself to the rather narrow subject of the scientific and technological investigation of, or research into, coal types or the suitability of available 'ranks' for specialised purposes. Nor does it deal with the technicalities of oil products or the utilisation of natural gas. It does, however, draw a very convincing picture of a large country, as Canada is, where the comparatively small population is concentrated in a narrow band running roughly east and west, and where, to make indigenous fuel transport more difficult, the coal resources are very unevenly distributed and the most important oil and natural gas fields are found in sparsely populated areas. Transport costs therefore become a very important factor in the price of fuel at points far removed from fuel sources, and are the cause of what seems to us at first sight almost a paradox.

The Canadian coalfields are confined to the Maritime Provinces in the extreme east and to Southern Alberta with some minor deposits in British Columbia. There are some lignite deposits in Ontario and Manitoba; but in neither of these provinces nor in Quebec is there any coal production. Although productivity in the Canadian coalfields is one of the highest in the world at 2.9 tons per man per shift in the mines and 15.1 tons in the opencast workings, giving an overall average of 4.1 tons, it is not economic to transport coal to these three provinces over the great distances involved. Of the 16 mill. tons consumed by Ontario and Quebec in 1958, 13 mill. tons was imported almost entirely from the United States. In the same year 3 mill. tons was brought in from the Maritime Provinces under Federal Government assistance.

A similar position would seem to be possible for oil and natural gas from the great oilfields of Alberta and Saskatchewan and to an even greater extent from the natural gas wells of northern British Columbia and the Northern Territories, except that it involves exporting a surplus.

Oil flows by pipe-line from Edmonton, Alberta, to Sarnia, near Toronto, a distance of 1,770 miles, and a natural gas line brings gas from Alberta to Montreal, a distance of 2,250 miles. To transport oil any further east would be uneconomic since it would have to compete with oil imported by sea from abroad, which appears to be cheaper, and it would disturb the coal industry in Nova Scotia. In consequence a large amount of oil is exported to the United States in mid-Continent, and natural gas west of the Rockies will almost certainly be fed into the Pacific North West natural gas transmission system over the American border.

The paper goes on to discuss the potential fuel resources of the Dominion and it is immediately clear that they are very great indeed; but since we are clearly more interested in gas and possibly coal consumption than other forms of fuel, we will confine ourselves to the consideration of these alone.

Our first impression is that even in the days when coal consumption was at its height, it was relatively small. In 1948 the total Canadian coal consumption was 47 mill. short tons which had fallen to 25 mill.

in 1958. In the same year the total coal carbonised was some 5 mill. tons, of which only about .75 mill. was indigenous, with the balance imported from the United States. Carbonisation appears to have been mostly confined to the hard coke industry and the plants were Koppers and Wilputte ovens, spread over four large installations, varying in yearly throughput capacity between 2 mill. and 900,000 tons.

The importance of the 'fluid fuel' discoveries since the war are immediately clear. Mr. Ignatieff gives the total reserves of natural gas in 1958, at 23,295 bill. cu.ft. (10^{12}) and the total production that year as some 380,000 mill.

The building of transcontinental pipe-lines has gone ahead rapidly. The West Coast Transmission line, which operates to the West of the Rockies, was completed in 1957, and the Trans-Canada, carrying gas eastwards, in 1958. Production has risen quickly too, from 53,000 mill. cu.ft. in 1947 to 220,000 mill. in 1956 and some 400,000 mill. by 1958. Unfortunately figures do not appear to be available since 1958 so it is not possible to see how great an increase the completion of the Trans-Canada pipe-line may have caused.

The obvious inference to be drawn is that industrial activity must have been speeded up very considerably, but without the discovery of these gas and oil fields it would have been much longer delayed; the standard of life has clearly risen equally quickly. This will be all the more apparent when it is remembered that similar tariffs to those in the United States have been adopted for the sale of natural gas. These very long pipe-lines demand an extremely high continuous load factor if they are to be worked economically, and to realise this gas is supplied to industry through a system of 'interruptible' tariffs to take up any slack in demand.

Domestic consumers, even where manufactured gas was available in the past, should now have an improved service, but those hitherto less fortunate will, we think, have taken full advantage of the new supply if the new pipe-lines are in their vicinity.

This tremendous increase in energy potential which has become available in the last few years, by which a cheap, though interruptible, source of fuel on tap is provided for industry, may well solve, some of the difficulties which the Dominion has had to face in the past through difficulties in transporting its fossil fuels.

Reconstruction at Scunthorpe

SOMETIMES we publish papers which describe situations which are only too familiar to the older generation of gas engineers. At one time in the smaller gasworks which was not too well endowed, improvisation was the order of the day, and the success of the undertaking depended largely on the ingenuity of the gas engineer, and the co-operation of his engineering staff and his skilled craftsmen.

Since nationalisation, with the building of up-to-date plants and the introduction of planned maintenance schemes, conditions have changed and the occupation of gas making has lost something of its excitement. Science, the handmaiden of industry, has been called in and the running of the new plants has become a cut and dried affair looked after by a shift engineer, aided by a laboratory with a shift chemist in attendance.

It was rather refreshing, therefore, to feel something of the excitement of the old days and a little of the empiricism of the pre-nationalisation period, when we listened to Mr. S. H. Stokes' paper: 'The Fifties at Scunthorpe' read to a recent meeting of the Eastern Section.

Perhaps our first reaction was one of surprise that such situations as he described were still possible, but on more mature consideration it became apparent that the situation which confronted Mr. Stokes and his colleagues was unusual enough in these modern times for us to give the paper our closest attention.

The output of steel in Great Britain since the war has increased enormously, and this in turn has made necessary an increase in works capacity as well as provision for more personnel to work the new installations. Steel manufacture seems to have established itself in certain well-defined areas in the country, generally on the seaboard to facilitate the handling of imported ores and to cut down the need for long carries inland. These large plants which, year by year, appear to be increasing in capacity, must also be reasonably near a coal field to allow easy transport of coal to the works' coke ovens or low freight charges on coke made in colliery coke ovens. A suitable site for such a works was found at Scunthorpe in Lincolnshire by the steel industry between the wars.

It was not till after the war that real prosperity seems to have 'hit' Scunthorpe, and, as always, when this happens, the services of the public utility undertakings are required to provide for an expanding population with plenty of money in its pockets.

In addition to meeting these potential demands, Mr. Stokes had to plan for a local link-up among the smaller undertakings in the immediate vicinity, as well as to make every effort to maintain his district pressures as housing estates sprang up round Scunthorpe itself.

The chief problem facing him was that most of the gas distributed by the old Scunthorpe works was coke oven gas from the existing steel works, the contract for which was with the Appleby-Frodingham Steel Co. Ltd., and which amounted to 75 mill. cu.ft. per day; the contract was due to end in 1957.

Before Scunthorpe's expansion this quantity of coke oven gas, suitably diluted, had been sufficient, and the existing carbonising plant had been allowed to fall into such a state of disrepair that it was as good as useless. Fortunately for Mr. Stokes, he was able to obtain a horizontal plant from 'off the shelf' which had been ordered by another board but not installed. Thus Scunthorpe I was built in time to prevent a shortage of gas. This was followed in due course by Scunthorpe II, a similar plant and capable of making enough gas for future increased demands.

This was an achievement worthy of any gas engineer,

especially since ancillary plant had to be repaired and extended to deal with the extra volumes of gas, and as much work was needed on the site itself.

The disturbing part about the whole operation was that when it had been completed, far greater quantities of coke oven gas became available which made the two new horizontal plants superfluous. They were later closed down, though dilution plant in the form of two Tulley plants was retained. The additional coke oven gas helped to make possible the North Lincolnshire gas grid, which was able to absorb the Scunthorpe undertaking and its immediate neighbours into a more widely connected whole. It was indeed unfortunate that it could not have happened earlier so that the situation at the Scunthorpe undertaking could have been more easily and less expensively relieved. It must have been something of a millstone round its neck to have two carbonising plants of ten years' old or younger on its hands which were not gas making. We can only assume that the price paid for the extra coke oven gas was so advantageous as to make its purchase worthwhile.

As the works were reconstructed, so also was the local distribution system extended to supply gas to new housing estates and improve the pressure to existing consumers. These extensions were laid out according to the most modern engineering practice, and it was noticeable how quickly the new provisions became effective

Such papers as these illustrate the ability with which many gas engineers faced the very difficult years directly after nationalisation, but at the same time they reveal the straightjacket in which many former undertakings might have found themselves under similar circumstances.

Commentary on the News

Clean and Decent

LAST night we attended the launching of Mr. Lawrence Wright's fascinating and exhaustive historical exploration of the bathroom and water closet, aptly entitled *Clean and Decent* (Routledge & Kegan Paul, 30s.). Regrettably perhaps the ceremony was held neither at the Turkish Baths, nor in the powder room at the Savoy Hotel, but in the book lined, completely un-tiled, surroundings of Foyles. Nevertheless, hygiene and hysterics were in the air, the British apparently enjoying a heady sense of emancipation at thus mentioning the unmentionable.

The book, which has grown out of the feature which Mr. Wright arranged at the Building Exhibition recently, represents a painstakingly thorough research into a subject which, we suspect, has been unevenly documented through the years, depending on the attitude—religious, medical, Rabelaisian—obtaining during various periods.

The gas industry has a very special interest in the nation's reluctant acceptance of bathing, and indeed the 'GAS JOURNAL' and its predecessor, *The Journal of Gas Lighting*, are among the authorities quoted. The first reference to gas in connection with water heating was about 1850 when the surprising claim was made for the 'Magic' heater that it would give a hot bath in six minutes for 2d. worth of gas. This device had no boiler, being set under the bath, and was the forerunner of the gas bath proper which came to full flower in Ewart's 'General Gordon,' complete with 'charmingly detailed towel warmer.' Maughan's first gas geyser which, says Mr. Wright, had something of the charm of an early Great Western locomotive, appeared on the scene in 1868, followed by Sugg's 'Boiling Stream Therma.' The author points out that the performance of some of the early geysers compared quite well with that of today, and quotes a unit made by Strode and exhibited at the Cyrstal Palace Exhibition in 1882 which, using less than 100 cu.ft. of gas an hour, could raise 80 gal. of water an hour through 60°F.

The first geysers lacked safety devices and Mr. Wright's description of some of the misfortunes which could overtake unwary users are amusing: 'It is probably only a few obsolete geysers that still occasionally give those unmistakable distant crumps that can be heard in the quiet of a London Sunday morning. A new generation is growing up without our inborn fear of the "gusher or rager".'

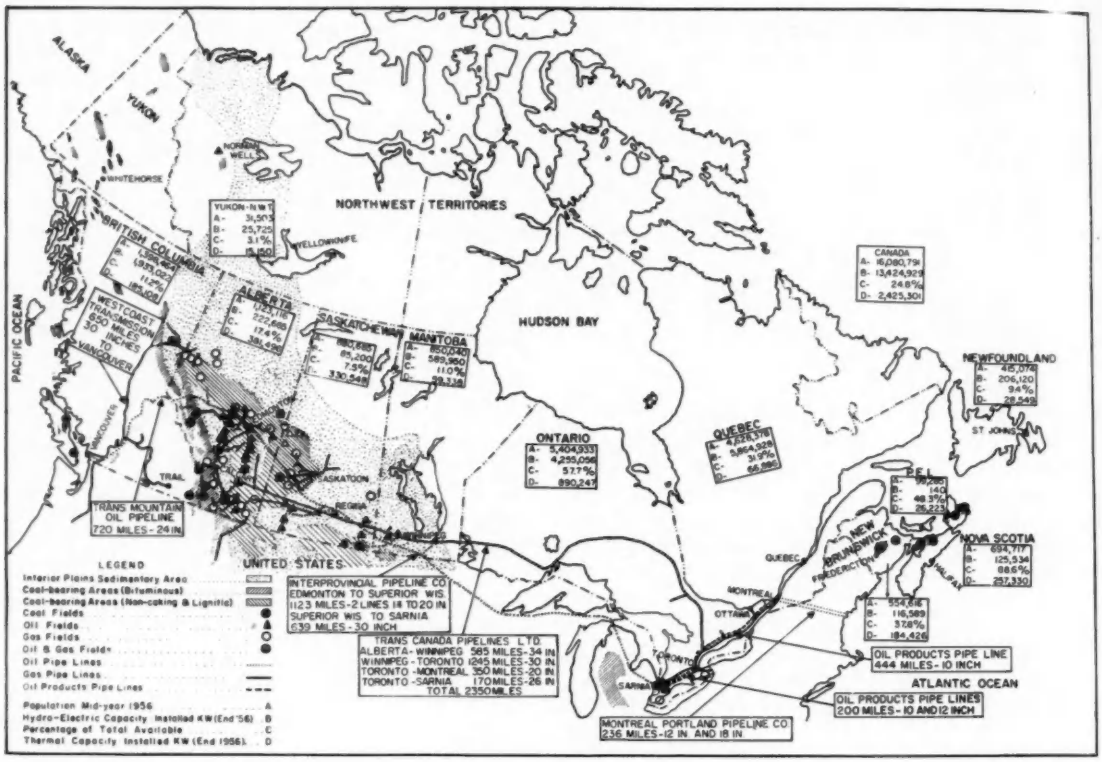
This history of bathing is an intriguing one, but on the whole less bizarre than that of the water closet which is studded with rare gems of human ingenuity and eccentricity. Alas, neither the space available nor our 'terms of reference' permit us to dilate on these wonders. Suffice it to say that in all such matters Mr. Wright leaves no chain unpulled; he is indeed The Specialist.

Link-up with London

THE reputation of *Link-Up*, the North Western Gas Board's magazine, is justly high, but the current issue is worthy of very special mention. Never before, to the best of our knowledge, has any journal set out to explain exactly what the Gas Council is, what it does, and who does what. To produce within 20 pages or so a complete profile of the Council and its principal officers is no mean feat, but Miss Ann Bradbury and Mrs. G. D. Spiller have between them done a first-rate job. Copy, pictures, typography and layout are all of the highest order, and the feature not only succeeds in giving a clear picture of the Council's constitution, responsibilities and ramifications, but it impresses upon the reader something of the character of the individuals who keep the Council's complex machinery running smoothly.

Except for the area board chairmen, no studio portraits are used. From Sir Henry Jones to the sergeant on the door the denizens of Murdoch House appear pretty much as we know them, and the atmosphere is captured by photographs of parts of the building and even of the views from certain of the windows. Of course, there is more to the Gas Council than Murdoch House—there are the research stations at Fulham and Solihull. These are described at some length and an indication is given of the type of work being undertaken.

Clearly the purpose of this comprehensive review is to expunge from the minds of *Link-Up* readers any preconception of the Gas Council as a vague, Olympian body far removed from hard-working North Western employees such as themselves, and in its place to create an understanding of a live organisation whose efforts are intimately linked not only with the North Western but with all 12 gas boards. In this the issue has been brilliantly successful, and we commend the idea of a Gas Council issue to the editors of other board magazines.



Canada's energy sources and principal pipe-lines. (Courtesy, Institute of Fuel.)

Fuel technology in Canada

By A. IGNATIEFF, Chief, Fuels Division, Mines Branch,
B.Sc.(Lond.), A.R.S.M., M.I.Min.E., M.I.M.M., M.Inst.F., M.A.C.S., F.R.C.G.S.

Department of Mines and Technical Surveys, Ottawa.

SINCE the end of the war, Canadian fuel economy has been characterised by an upsurge in the production and use of fluid (i.e. oil and gas) fuels. Up to 1951 a reasonably steady and at times an increasing demand for coal maintained a level of indigenous production and importation comparing favourably with that before the war and indicating that coal was participating in the economic expansion of the country. However, during the last four years traditional markets have shrunk substantially and few alternative outlets can be foreseen in the immediate future. During this period an important uranium industry has also been developed.

Although small oil and natural gas industries have existed for several decades, principally in Alberta and Ontario, it was the discovery in 1947 of the Leduc oilfield in Alberta that inaugurated a new era in the exploration and discovery of petroleum and natural gas resources in Western Canada.

Canada now stands second among the countries of the world in per capita annual consumption of oil at 16.8 barrels compared with 4.7 barrels in 1939. The problem of how Canada can be self-sufficient in oil is largely one which affects all Canadian fuels. The fossil fuel resources occur on the thinly populated margins of the Canadian land mass whereas concentrations of population and industry are in the centre. Transportation is thus the key factor in the Canadian fuel economy.

All ranks of coal from lignite to semi-anthracite occur widely in Canada. Although there are lignite deposits in Ontario and Manitoba, these provinces, which with Quebec form the central area of Canada, have no coal production. The total Canadian consumption of coal in 1958 was about 25 mill. short tons compared with 47 mill. tons in 1948, Ontario and Quebec using about 16 mill. tons of which slightly over 13 mill. tons was imported, mostly from the United States. In 1958, about 3 mill. tons of Canadian coal were moved to Ontario and Quebec.

Canada has ample coal reserves, of which a little over half can be described as of caking or coking quality

represented by high- and medium-volatile ranks. The remaining reserves are lignites, sub-bituminous or low-volatile, non-caking coals.

The largest fall in coal consumption has occurred in the railway and domestic sections. In 1947 about 12 mill. tons were used by the railways whereas in 1958 the amount used was about 1¾ mill. tons. Similarly, the amount used for domestic heating fell from 13 mill. tons to 5 mill. tons during the same period. Use of coal for thermal power, on the other hand, is increasing but has not yet offset the losses in other markets.

Some three-quarter of a mill. tons of Canadian coal and about 4 mill. tons of United States coal were carbonised in 1958 to produce about 3½ mill. tons of coke, mostly for the ferrous metal industry.

Until the advent of natural gas to central Canada there were several retort coke-gas and carburetted-water-gas plants but most of them have now closed down Coke-oven gas is consumed at the plant. In one instance a chemical plant adjoining a carbonisation plant processes the coke-oven gas to manufacture anhydrous ammonia and urea. The light oils are fractionated into standard commercial products such as benzole and toluol; ammonium sulphate is sold for fertiliser.

Generally speaking, opportunities for developing a large carbo-chemical industry based on carbonisation or gasification of coal do not at present exist in Canada but some day coal may contribute to such development.

Oil and natural gas are found in many of the provinces but the largest reserves and production are in Alberta. Transportation costs, as in the case of the coal industry, are a dominant factor, affecting development and production.

Cautious estimates of reserves

The reserve figures are cautious and do not reflect the potential reserves of the large sedimentary basins favourable to petroliferous occurrences in Canada. The largest, the western basin of about ¾ mill. sq. miles lying between the Rocky Mountains and Ontario and extending from the U.S. boundary to the western Arctic, contains about 950,000 cu. miles of sediments. Cautious estimates of potential reserves for this area are 30 bill. (10^9) barrels of oil and 170 trill. (10^{12}) cu.ft. of gas. Other Canadian areas that may become productive when they are intensively explored are the Arctic islands and the sedimentary area of some 125,000 sq. miles on the southern and western sides of Hudson Bay and James Bay. The oldest producing area in Canada is in south-western Ontario, covering about 26,000 sq. miles. There are also favourable areas in Quebec and the Maritimes, with a small field in New Brunswick which began producing about 50 years ago and some occurrences of gas in the St. Lawrence lowlands.

Most of the reserves known to exist in Canada are light-gravity oils, although some formations, notably in the Lloydminster area on the border of Alberta and Saskatchewan, have produced only heavy crudes.

Nearly three-quarters of the natural gas reserves are not associated with oil. The remaining quarter is associated or dissolved gas. Valuable by-products of natural gas production are casinghead gasoline, naphtha, propane and butane. Quite a large liquefied gas industry has developed in western Canada (about 1 mill. barrels in 1958) to provide bottled gas for isolated areas and for other purposes. The bottled gas industry in eastern Canada is based largely on refineries.

Exploration is limited

A large portion of the gas reserves in western foothills structures are rich in sulphur and it is estimated that the 170 trill. (10^{12}) cu.ft. potential reserves would produce about 150 mill. tons of sulphur. In addition to the conventional fluid reservoirs, an estimated area of 10,000 to 30,000 sq. miles of Athabasca 'tar' or 'oil' sands in northern Alberta averages about 10% bitumen content, and a low-grade oil shale area at Albert, New Brunswick, has a 4 to 5% oil content. Over many years, the Athabasca 'tar sands' have received much attention because of potential reserves of oil spoken of as from 100 to 300 bill. (10^9) barrels. These figures can only be regarded as guesses since exploration is small in relation to the total area.

Cretaceous and Devonian formations have been the source for most of the production in Canada. The wells in the Ontario fields are mostly less than 2,000 ft. deep but the average depth of holes in western Canada is nearly 5,000 ft., because of structures in the foothills belt where large closures are often encountered and deep holes of the order of 15,000 ft. have been drilled.

Canadian oil production was rising steadily until 1957 when it reached 181,812,317 barrels or the order of 25 mill. metric tons. About one-third of this crude production was exported to mid-continent and western United States, principally from Alberta. Canadian crude production fell by 9% in 1958 mainly owing to United States restriction of imports from western Canada. The western production capacity of about 1 mill. barrels per day would make Canada self-sufficient as the current Canadian demand is approximately 270 mill. barrels per year. However, the western industry is currently producing at half-capacity.

Natural gas production of the west, dependent on local industrial and domestic use, has risen steadily, quad-

PRODUCTION AND ESTIMATED CRUDE OIL AND NATURAL GAS LIQUID RESERVES IN THOUSANDS OF IMPERIAL BARRELS

	Production in 1958	Proved reserves at end of 1958
Northwest Territories	466	52,409
British Columbia	1,963	36,534
Alberta	116,948	2,995,190
Saskatchewan	44,910	531,409
Manitoba	5,871	27,500
Ontario	777	6,978
New Brunswick	15	77
	170,950	3,650,097

PRODUCTION AND ESTIMATED RESERVES OF NATURAL GAS IN MILLION CUBIC FEET

	Production in 1958	Proved reserves at end of 1958
Northwest Territories	337	29,427
British Columbia	62,511	1,687,626
Alberta	257,446	20,222.824
Saskatchewan	44,332	1,165,003
Manitoba	515	2,345
Ontario	15,350	186,783
Quebec	—	83
New Brunswick	124	961
	380,615	23,295,052

Source: Canadian Petroleum Association.

From a paper to the Institute of Fuel, presented by R. J. Brearley, M.B.E., on January 13, 1960.

rupling from 53 bill. (10⁹) cu.ft. in 1947 to 200 bill. cu.ft. in 1956. The effect of completing the first trunk pipeline (West Coast Transmission) in 1957 was an increase in production to about 400 bill. (10⁹) in 1958. A similar substantial increase can be expected to follow completion of the Trans-Canada pipe-line late in 1958. However, the growth of the natural gas industry, so dependent on Canadian western sources, will be influenced in the immediate future mainly by the welcome it receives in the populated and industrial areas of Ontario and Quebec and by the availability of markets in mid-continent and western U.S.A. Two more projected pipe-lines, based on the large 'wet' gas reserves in the foothills belt of Alberta, await authorisation. The large amount of liquid hydrocarbons which will be available from producing this 'wet' gas and which will not be able to find local markets has led to proposals to build a products line to the Pacific Coast and one to the head of the Great Lakes.

There are no undergraduate courses in fuel or coal technology in Canadian universities, other than a petroleum engineering course at the University of Alberta. Few post-graduates undertake research on coal subjects for thesis requirements. However, some coal-producing provinces encourage research on coal by grants to suitable candidates. The Nova Scotia Research Foundation for some ten years has sponsored post-graduate work in coal geology and chemistry, principally at the Massachushetts Institute of Technology (geology and petrography) and Mount Allison University, New Brunswick (coal chemistry). The Foundation's Associate Committee on Coal Research co-ordinates all investigational and research activities of university, provincial and federal personnel engaged on coal research in relation to Nova Scotia.

The largest provincial effort on coal research is pursued by the Alberta Research Council which, since 1919, has devoted an important section of its activities to coal. In the last few years, and particularly since opening of new laboratories, the coal section has been enlarged and many projects are being investigated. Geological surveys have been made of the more important coal areas, and many thousands of samples of coal collected by provincial mines inspectors from all parts of the province have been analysed. Data so obtained have provided a catalogue of the nature and composition of these coals as well as a basis for assessing their suitability for various uses now and in the future.

The oldest fuel research agency in Canada is the Fuels Division of Mines Branch, Department of Mines and Technical Surveys, Ottawa, dating from 1907.

Separation of oil from sand

Because of the importance of fossil fuel resources in Alberta the Research Council of Alberta devotes considerable research effort to fluid fuels as it does to coal. A major investigation since the inception of Council has been connected with the separation and utilisation of the Athabasca oil sands. The work has involved separation of the oil from the sand by a hot-water process, studies of various factors which influence the characteristics of the separated product, and finally, economic studies related to the utilisation of this heavy oil.

Present studies of Council's petroleum section are being directed to four fields: Exploration, production, transportation and processing. The exploration field includes studies on the origin of crude oils, the main approach being through examination for trace metals and associated porphyrin structures. The latter study, carried out on the degradation of chlorophyll under sedimentary conditions, has included the effect that various clay minerals have on chlorophyll degradation. In the production field the Athabasca oil sand studies have been broadened to include consideration of the recovery of oil from all types of reservoirs.

An attempt is being made, in transportation studies, to reduce greatly the frictional losses occurring when oil is transported through pipe-lines. Any substantial success would not only reduce the cost of pipe-line transportation but also make easier the movement of heavy crude oils. Petroleum-processing research is concerned with two problems: The removal of sulphur from crude oil, and the fundamental chemical reactions that hydrocarbons undergo during processing by heat. The first study has developed along lines of separating, identifying and describing the sulphur compounds occurring in crude oils as a first step in the development of processes for the removal and possible utilisation of the sulphur contaminants.

Natural gas investigations

Present investigations on natural gas include: pyrolysis of both liquid and gaseous hydrocarbon feedstocks to produce ethylene, acetylene and possibly carbon black; adsorption of ethane-ethylene mixtures by molecular sieves; retention volume studies of hydrocarbon gases on chromatographic columns; and isotope separation effects associated with adsorption and diffusion.

In the Fuels Division, Mines, Branch, Ottawa, an integrated programme of research on petroleum and hydrocarbons is mainly directed to the most efficient utilisation of the country's low-grade oil reserves such as the Athabasca oil sands and the Saskatchewan low-grade crudes.

In 1958, Canada became the world's largest producer of uranium oxide with a production of 13,461 tons valued at nearly 280 mill. dollars. There are now 19 mills which are capable of treating about 50,000 tons per day. The mining reserves are large, of the order of 400,000 tons of uranium oxide, and mainly occur in the Blind River district of Ontario, which accounts for about 70% of Canadian production. The other producing mines are at Bancroft, Ontario; Lake Athabasca, Saskatchewan; and Great Bear Lake, N.W.T. Although one radium and uranium mine was in operation at Port Radium (Great Bear Lake) before 1940, the exigencies of war gave the impetus for the development of today's flourishing Canadian uranium industry. Through wartime necessity much of the exploration and all mining and refining of uranium as well as development of reactors were controlled by the Federal government through Crown agencies or departments.

The wartime project in which the United Kingdom and Canada were jointly involved was directed to the development of reactors fuelled by natural uranium with moderation of the neutrons by heavy water. In essence, Canada has continued in this direction after the United Kingdom and the United States went separate ways after the war. The present organisation of the Canadian uranium industry consists of two Crown corporations—Eldorado Mining & Refining, Ltd., and Atomic Energy of Canada, Ltd., functioning under the control of the Atomic Energy Control Board—and the independent producers of uranium mill products.

The first reactor at Chalk river was an experimental unit for studying the physics of natural uranium—heavy water operation. In 1947, another experimental reactor, known as NRX, capable of producing thermal power equivalent to 40 MW., was started. It uses natural uranium sheathed in aluminium. The neutrons are

moderated by heavy water and the heat is removed by ordinary water. A third reactor, NRU, brought into operation recently is a natural-uranium, heavy-water moderated reactor designed to produce 200 MW. of thermal power with the highest neutron flux of any research reactor. This reactor is cooled by heavy water and its purpose is to provide experimental and research facilities for the development of commercial power reactors in addition to producing substantial quantities of plutonium.

At present, Canada's first power reactor, known as NPD-2, of 20-MW. capacity, is being built for demonstration purposes jointly by Atomic Energy of Canada, Ltd., Ontario Hydro-Electric Power Commission and Canadian General Electric Company. The NPD-2 reactor will use uranium oxide pellets contained in zirconium alloy sheathing. Some of the research on the problems associated with the use of uranium oxide has been done by Mines Branch.

Although coal is the most abundant of Canada's reserves of fossil fuels and is comparatively cheap at the sources of production, the cost of transportation and distribution makes Canadian coal vulnerable to the competition of oil and gas and even of U.S. coal in Ontario and Quebec. In the foreseeable future coal will continue to play an important role in the generation of electric power, as illustrated by the very large coal-fired steam plants in Ontario and the plans for expansion Plants at Toronto and Windsor, fuelled by coal cheaply transported by water from United States ports, have generating capacities of 800 and 264 MW. respectively and additions in 1960 and 1961 will bring the Toronto plant alone to capacity of 1,200 MW. Two further plants are planned for 1961 at Long Branch and Fort William with 300 and 100 MW. capacity respectively, with an additional 300 MW. planned at Long Branch plant for 1962.

Lignite, which can be regarded as the cheapest fossil fuel at source contributes to the generation of electricity in Manitoba and Saskatchewan. Recently a new plant of 132 MW. generating capacity has been erected at Boundary Dam, Esteven area, in the centre of the largest lignite field.

The Royal Commission on Canada's Economic Prospects (Gordon Commission) in 1957 in its separate study of energy prospects visualised that in 1980 the total Canadian energy consumption would be approximately the equivalent* of 300 mill. tons of coal and would be derived, expressed as percentages from the various fuels, thus:

Coal	16
Petroleum	45
Natural gas	25
Wood	1
Water power	11
Nuclear energy	2
	100

These figures forecast at least a doubling of the present coal consumption.

The consumption of oil and natural gas undoubtedly will continue to increase: Oil in the motive power field, domestic and commercial heating, and manufacture of petrochemicals; natural gas for heating, energy uses and manufacture of petrochemicals. Substantially increased use of natural gas projected by the Gordon Commission assumes a Canadian pattern of growth similar to that in the United States but it is too early at this stage of development to predict definitely that experience in the United States will apply in Canada.

* 1 short ton taken as 27 × 10^6 B.t.u. by the Commission.

New Canadian gas telemetering system

IN order that operating personnel may know at any minute of the day or night how much gas is being consumed throughout the marketing area of the affiliated companies of Northern Ontario Natural Gas Company and Twin Cities Gas Company, in Ontario, Canada, a telemetering system has recently been installed at a cost of $65,000 (£24,000 approximately) which is claimed to be unique in the Dominion. The companies are currently supplying a maximum of 73 mill. cu.ft. of natural gas to 4,300 customers.

With the installation and completion of 33 natural gas distribution systems, extending from Kenora to Orillia in Ontario, a distance of about 1,165 miles, late in 1958, a system of load balancing became imperative in order to maintain a constant high load factor, to maintain operating pressures and to make certain that the companies did not exceed their daily contracted supplies from the Trans-Canada Pipe Line Co. Ltd., for which over-purchases rigid penalties are imposed.

The distributing systems are supplied with gas from the Trans-Canada pipe-line at 24 points. Volume storage is impractical and 'peak shaving' equipment not feasible. The gas is, therefore, sold in two major categories; 'firm' (domestic, commercial and industrial) and 'interruptible' (industrial) by 'block' volumes of corresponding amounts. This makes it possible to set the 'daily contracted purchase demand' for sufficient quantities of gas to supply 'firm' gas customers during the winter peak consumption months and sell the same quantities of gas by supplying to the 'interruptible' customers during the summer or off-peak consumption months.

Early in 1958 the Northern Ontario Natural Gas Company made a study of their requirements in respect of a telemetering system. An 'audio-tone' system was initially considered but it was found that, while the purchase and installation costs were favourable and the provision for future expansion and additions at minimum cost excellent and the system, therefore, offered flexibility, the cost of leasing a line for signal transmission was excessive. The use of micro-wave transmission of signals was also found to be impracticable, due to mineral deposit interference *en route*. Here, again, too, the cost was excessive and there was likely to be interference in the northern hemisphere.

A third system, that of the electrical impulse time signal, was found to fit the company's requirements. The initial purchase and installation cost was reasonable and, indeed, approximately the same as for 'audio-tone'; expansion and additions were limited only in the Western section; the cost of leasing a transmission line was reasonable, being only about one-third that for 'audio-tone'; its operation, repair and maintenance presented no problem. This latter method of telemetering was therefore chosen and the equipment purchased from the Bristol Company of Canada

Continued on p. 324.

GAS JOURNAL February 24, 1960

From a paper to the Eastern Section of the I.G.E., London, December 10, 1959.

The fifties at Scunthorpe

By S. H. STOKES, M.Inst.Gas E., M.Inst.F.,

MANAGER, SCUNTHORPE GROUP, EAST MIDLANDS GAS BOARD.

UPON nationalisation the Scunthorpe and Brigg local authority undertakings, together with the Winterton, Barton-upon-Humber and Barrow-upon-Humber gas companies, were merged into the Grimsby sub-division, and, as elsewhere, during the subsequent 23 months small administrative changes took place involving the co-ordination of accounts and some attempt to provide common services.

In April 1, 1951, the three sub-divisions of Lincolnshire were merged into one division with headquarters at Lincoln; and since the county area is 2,700 sq. miles in extent, it was decided that the best efficiency in day to day running would be obtained by a measure of de-centralisation through grouping based upon the larger undertakings. Of the nine groups so formed, this paper refers particularly to Scunthorpe to which unit itself were attached the small undertakings detailed in the preceding paragraph. The group manager was (and still is) fully responsible to the divisional general manager for the day to day working of the group in all its aspects; he is assisted by a deputy group manager with direct control of production and who assumes full authority in his absence.

Additionally at this time there were local managers in charge of the small undertakings—with an accountant technically responsible to a divisional officer and administratively to the group manager. The purpose of such organisation was not only to ensure the best use of available personnel at group and local level, foster initiative and provide expeditious channels for the dissemination of information and instructions, but to preserve the intimate association prevalent between consumer and local management and if possible foster confidence and improve the standard of service which only the larger undertakings could provide.

The total written-down value of pre- and post-vesting assets amounted to £352,489; the total capital charges totalled £24,166, equivalent to 3.031d. per therm of gas sold.

The pattern of progress during the intervening years has been governed by:

1. The necessity for reducing the cost into holder of gas produced at the small works and by so doing at least to minimise the very substantial deficits being incurred by them.

2. The changing scene as affecting the availability of coke oven gas from the local steel works. At April 1951 the Board had a contract with the Appleby-Frodingham Steel Company for the supply of ¾ mill. cu.ft. daily; the contract was due to expire early in 1957, but since there was no suggestion of any other supply becoming available at that time, a decision had been taken that gas supplied from the Scunthorpe undertaking would be manufactured by one of the more usual carbonising processes.

3. The rapid growth of the town and district of Scunthorpe. Consumers had increased from 10,800 at vesting day to 12,944 at March, 1951; local planning was based on the knowledge that the steelworks would continue to develop output for a number of years. Housing programmes were being prepared accordingly and by the date under review it was already apparent that the demand for gas had outstripped the ability of the local undertaking to give an adequate supply.

To resolve these problems, and to provide a service at once adequate to the consumer and economic to the Board, and to maintain the gas supplied in the Scunthorpe district itself at the lowest tariffs operating within the area, the various solutions decided upon appear to have phased themselves into three distinct periods, *viz.:*

Period 1. April 1, 1951-March 31, 1954—'First aid.'

Period 2. April 1, 1954-September 30, 1957—'The full treatment.'

Period 3. October 1, 1957-September 30, 1959—'Vitality restored.'

Shortly after nationalisation the Board had decided to install at Scunthorpe horizontal carbonising plant originally ordered for an undertaking in the Eastern Board's area, but due to integration, now surplus to that Board's requirements; the plant had a capacity of 600,000 cu.ft. of 500 B.t.u. gas per day. This decision was taken for two reasons:

TABLE 1.

The Scunthorpe group as at April 1, 1951

Undertaking	Type of Plant	Daily Capacity (Therms)	Send Out (Therms)	Sales (Therms)	Consumers
Scunthorpe	Coke oven gas with verticals producing 350 b.t.u. gas	5,000	1,743,316	1,391,224	12,944
Brigg	Verticals	1,220	280,959	269,020	2,271
Barton-upon-Humber	Horizontal, machine charged, stop end	1,250	200,505	172,775	1,773
Barrow-on-Humber	Horizontals, hand charged, stop end	50	11,070	5,515	140
Winterton	Horizontals, hand charged, stop end	480	52,540	44,621	517
Total		8,000	2,288,390	1,883,155	17,645

1. The vertical retort carbonising plant was in an advanced state of deterioration; it urgently required re-building, and indeed extension. The delivery period required for a new installation was not less than two years—the horizontal plant could be obtained 'off the shelf.'

2. The expiration date of the coke oven gas contract.

Hence orders had been placed in 1950, not only for the retort house and carbonising plant, but for a 10-therm dilution producer, exhausters in a new building, a condenser, a detarrer, wet purification plant capable of handling 1½ mill. cu.ft. daily, and a 1 mill. cu.ft. spirally guided gas holder in a steel tank.

In September, 1951, the whole of this plant with the exception of the new gasholder was put to work and the old verticals shut down. Thereafter the practice was to accept the maximum available volume of coke oven gas at a c.v. of 535 B.t.u. per cu.ft., manufacture the balance as coal gas at a c.v. of 560 B.t.u. per cu.ft., admit a predetermined volume of air (controlled by orifice) for purification, and dilute with producer gas to the declared value. The diluent was delivered into the foul coal gas stream at the inlet of the retort house governer, and the volume hand controlled by operation of the valve of the steam/air injector. The maximum gas made and purchased at Scunthorpe thus increased to 7,200 therms, and the group potential output became 10,200 therms.

There was, however, a restricting factor in the capacity of the Scunthorpe concrete purifier installation, which comprised four 30-ft. by 25-ft. dry lute boxes with a maximum estimated capacity of 1½ mill. cu.ft. per day. Considerable leakage was taking place caused by fracture of the structure, particularly at the external deck corners and this worsened considerably when the new holder throwing a pressure of 13 in. w.g. was commissioned in August, 1952. Some external 'first aid' repairs were practicable and were indeed carried out; these could however be only regarded as a very temporary solution.

Gratifying results

Hence it was only by the most careful technical control that a satisfactory standard of purity could be achieved and no integration with other group works could be contemplated until either new plant was installed or existing plant could be taken out of commission for an extensive overhaul.

The controlled admission of air by steam injection, bypassing of the coal gas ammonia washer to sustain the lack of NH_3 in the coke oven gas, and the introduction of soda ash to maintain the *p*H of the oxide were among the measures taken. One of the most gratifying aspects of this period was that we were not only able to maintain a satisfactory standard of purity but to work up substantial quantities of partly spent material accumulated over a considerable period.

One of the most pressing problems related to the quenching water requirements for the retort house. The problem was two-fold in that the only water available was that of the town supply—costing 2s. per 1,000 gal.—and secondly, the disposal of hot gritty water during the progress of the coke discharge.

The works is built on a partially surfaced worked piece of the local ironstone bed; its datum is some 15 ft. below road level. Gravity flow through the storm water drainage system was, and is, just possible, but any sediment deposition immediately seals the normal outfall. Bi-hourly quenching of coke was, of course, a necessity, and since calls on suitable works labour for necessary services were always pressing, the flooding of the works particularly during substantial rainfall was a matter of periodic repetition. Some means of water conservation with sludge deposition was urgently necessary.

The coke make per day was 45 tons and the water required (including wastage) in quenching it, was 9,000 gal. The estimated total cost of a recirculation system was £2,282 which would give an anticipated saving of £246 per annum.

The plant subsequently installed consisted of a 25 ft. by 15 ft. tank formed of 5 ft. by 4 ft. 6 in. secondhand purifier plates, divided into compartments by 9 ft. by 3 ft. plank partitions; the last two compartments were lined with hessian scrim cloth for more efficient filtering; the total capacity of the tank was approximately 10,000 gal.

Water was recirculated by one of two electrically driven centrifugal pumps, each of which was capable of delivering 2,000 gal. per hour of hot—70 to 80°C.—gritty water to the quenched sprays at 60 p.s.i. The pumps were thus of adequate capacity to treat the coke from a carbonising installation with double the existing output, and provide a margin for the extra quenching necesistated at peak load periods. The coke was in fact delivered direct from the D.B. conveyor into a 40-ton capacity buffer storage hopper, from which there was no subsequent screening; under these conditions efficient quenching was essential to eliminate the then all too frequent bunker fires. The actual cost of the recirculation system was £1,988.

Recommissioning saving

Elsewhere in the group, works' plant surveys resulted in projects being put in hand from which it was anticipated that immediate and substantial economies would be forthcoming.

At Briggs the vertical-retort installation was equipped with a vertical waste heat boiler—660 lb. of steam per hour—which had been standing disused for many years. Available information attributed this to the trouble caused by scale formation on the lower boiler end plate arising from the use of untreated feed water. It was estimated the recommissioning of the boiler would result in an immediate saving of £1,312 per annum. Accordingly a scheme was prepared for transferring a 100-gal. per hour Filtol water softening plant which lay redundant at another divisional works. The estimated cost of this work was: Retubing the boiler, £200; new alarm equipment, feed pump, and miscellaneous equipment, £260; the transfer and installation of the water softening plant, £400; making a total of £860.

Allowable contingencies on a project of this nature were estimated at 12½%; the total actual cost was £1,015.

At Barton-upon-Humber there was an immediate need for the admission of diluent into the horizontal coal gas for the following reasons: (a) To enable more stable conditons of bench control to be introduced, (b) to restrict the current unsatisfactory dilution arrangements, and (c) to increase thermal output.

A 1,500 cu.ft. per hour producer was installed, of which the generator was formed from a secondhand 24 in. by 12 in. C.I. tee—lined with fire brick and packed with slag wool with a capacity of 3 cwt. of fuel. The air supply was controlled by a slide built into an ash door fixed on the 12-in. branch. The crown was provided with two rodding holes and flanged to take the feed hopper. The scrubber was formed from an old turbo exhauster casting filled with Lessing rings and the wash box from a 12-in. double collar to which was fitted an external adjustable seal. The total cost of the plant was £122.

Coming now to the distribution situation confronting the group at this time, the prospects of expanding our

domestic business without further complicating an already critical situation were grave indeed. As early as 1946 a report had been presented by the then manager of the local gas department indicating that the supply problem should be considered under two headings. To quote: (1) 'The immediate reinforcement of the pressure throughout the district at the time of peak load,' and (2) 'The installation of a system sufficient to meet not only the likely future demands of the present area of supply, but those of a much larger area surrounding it. The whole 24-hour load of this surrounding district would naturally be fed from a high pressure system.'

Some progress had indeed been made in that a 10-in. ring main, 5,000 yards long, prepared for 'pressurisation,' had been laid from the works in an arc of the northern district perimeter to a point on the western boundary. By the early part of 1951 a scheme had received Board approval to install two compressors—each capable of delivering 60,000 cu.ft. per hour at 13 p.s.i. This plant was to be so arranged that it would not only deliver into the 10-in. main but also supply south Scunthorpe through a 14-in. main laid to Ashby Ville Corner, and indeed on to Brigg to provide a bulk supply to that undertaking. While satisfactory in itself, under the prevailing plant and mains delivery situation, the scheme could not possibly be put into effect for some two years, and the first essential was to ensure such supply as would enable us to meet our statutory obligations.

As an immediate palliative therefore, a secondhand K.B. booster of 110,000 cu.ft. per hour at 20-in. pressure lift was temporarily installed and put to work delivering into the Crosby main at the beginning of the December quarter of 1951. The effect in that district of the town was immediate—but the serious situation existing in the localities of town development to the south was immediately apparent from a pressure chart taken on Christmas Day of that year, when an extremely low pressure was recorded. To determine the extent of the problem a flow diagram was forthwith prepared illustrating theoretically the conditions existing during the maximum hours of the day in question; the works pressure thrown by the existing gasholder was 5½ in. w.g., but this was increased to 13 in. w.g. by a holder commissioned in the summer of 1952. A terminal pressure of 3.77 in. was shown, and while reasonably adequate for the requirements at the time, it would not allow for future development due to take place to the extent of 500 houses per annum in the southern part of the town. Indeed it was evident that the pressure would be at the minimum required by the Gas (Quality) Regulations, 1949 in 15 months.

Temporary booster

As a first measure then it was proposed that the 16-in. to 12-in. low pressure trunk main proceeding southwards should be disconnected from the 20-in. outgoing main and linked to a new 24-in. main emanating from the works; this latter main would be operated initially under boosted pressure. Additionally the trunk main should be extended 1,700 yards in 16-in. to the limit of the Brumby estates development. A second temporary booster of approximately similar capacity should be installed along side the existing booster, and the various branches off the former l.p. main and its extension fed through district governors. Such a scheme would involve a relatively small initial financial outlay and would eventually be superseded by a new feeder main through the centre of the town; the ultimate objective of ensuing an adequate l.p. distribution system would be thus achieved. A second flow diagram constructed during the winter of 1955-56 showed an initial pressure at the works of 27.7 in. w.g. and a terminal pressure at the corresponding branch of 7.81 in. w.g., and with a gas flow nearly double. This project was put in hand and the first governors commissioned before Christmas 1952.

The duplicate booster installation completed and put to work within 12 months consisted of a secondhand turbine driven machine of 200,000-cu.ft. per hour capacity at 12-in. pressure lift; the unit was converted to electric motor drive.

To supplement this scheme, it was recommended that schemes authorised in 1950-51 should be investigated with a view to directing the expenditure to more lucrative projects.

In such a category was the proposal to link up the Barrow-upon-Humber undertaking then sustaining a loss of not less than £500 per annum, with Barton-on-Humber; 6,000 yards of 6-in. steel main were due for delivery. It was calculated that transfer of the main to Scunthorpe to enable an extension of the 10-in. to be made from its most westerly point into the l.p. distribution system in that vicinity, could result in an immediate return of gas sales revenue approximating to £2,500 per annum. Expenditure on this project was therefore re-allocated and mainlaying commenced forthwith; the section was completed and commissioned in the December quarter, 1953.

Increased output

To revert briefly to the gas manufacturing situation about the middle of this period—in the foregoing paragraphs the anticipated output of the ensuing four years has received attention. Reference to Table 1 will show that barely 5% of increased output could be accommodated. Results from the carbonising plant during the winter of 1951-52 indicated that 20% increased output over nominal could be anticipated. Even so the rising trend of sales, the extended delivery period of the new plant and the anticipated termination of the coke oven gas contract in 1957, compelled a decision being taken with regard to immediate future manufacturing capacity. Accordingly the order for Scunthorpe II was placed—it was a duplicate of Scunthorpe I in all respects other than the three new settings were of the recirculating type and had a greater potential output.

In the summer of 1953 there was a complete change in the known situation as to the potential availability of coke oven gas. At this time negotiations were in progress for reinforcement of town gas supply to the steel works of J. Lysaght Ltd., the use of gas even then was to be restricted to the canteen and research laboratory.

In the course of local discussions it became evident that development recently envisaged for that works could lead to surplus gas becoming available. An agreement was in fact concluded by the Board in 1954, to accept not less than 1.6 mill. cu.ft. and not more than 2.5 mill. cu.ft. per day of unpurified coke oven gas for a period of 20 years; if the quantity delivered or taken dropped below 2.2 mill. cu.ft. per day, there was to be mutual consultation as to the estimated extent and duration of the reduction. The potential output of Scunthorpe works then became 18,700 therms and the maximum output, 20,400 therms.

It is not the purpose of this paper to deal in any detail with the planning needed to absorb the additional gas into the division and the establishment of the North Lancashire grid. The arrangements which were made, provided for the integration of smaller undertakings in the group to Scunthorpe. The main artery—a 15-in. cast iron main, tested to 50 p.s.i.—was laid from Scunthorpe works and passed through Brigg on its way eastwards towards other undertakings in North Lincolnshire.

The estimated date for the completion of the grid was for the winter of 1956-57, but a substantial contribution towards the cost of the scheme could be made by utilising the capacity of the main at comparatively low pressures to give a bulk supply to the undertakings nearest to Scunthorpe without waiting for the completion of the project. Section 1 was a 15-in. to Brigg; section 1(a) a 4-in. branch to Kirton-in-Lindsey; section 3 the 15-in. from Brigg to Caistor; section 4 the 12-in. extension to Louth as far as Thoresby, and section 5 was a 4-in. branch to Market Rasen.

River crossing

The laying of these various sections proceeded more or less simultaneously, the only substantial obstacle being the crossing of the River Ancholme 740 yards downstream of the Brigg works. The proximity of that works was indeed of considerable assistance in facilitating the crossing by providing a base for operations and in particular for the pontoon upon which the boom of the pipe bridge was floated to the point of erection. After the crossing and the insertion of the appropriate valves, a 12-in. branch was laid into the works itself.

In the meantime, temporary connections were made to the boosters already installed for local reinforcement at Scunthorpe, with the result that bulk supplies were made available to Kirton-in-Lindsey and Brigg in the March quarter of 1955. Furthermore, partly as standby, but mainly to ensure gas reaching Caistor and Market Rasen, a surplus electrically driven Bryan Donkin compressor, capable of delivering 30,000 cu.ft. per hour at 5 p.s.i. was temporarily installed and those undertakings received a supply in the December quarter of the same year. The Barrow to Barton link-up scheme, deferred in 1952, was put now into effect, and the village of 120 consumers supplied direct through a district governor installed at the perimeter. The Barrow works itself was shut down completely during the March quarter of 1955.

During the winter of 1955-56 with Scunthorpe II gas-making the peak daily gas made and purchased capacity was 10,950 therms. Although this was restricted to a nominal 7,500 therms because of the limitations of purifying capacity, the deliveries from the Scunthorpe works on the maximum day were made up of (a) Scunthorpe 7,830 therms, (b) Brigg 1,305 therms, (c) Kirton-in-Lindsey 190 therms, (d) Caistor 105 therms, (e) Market Rasen 385 therms, making a total of 9,815 therms.

The decision to take the new supply of coke oven gas and establishing the North Lincolnshire grid had led to the cessation of such preliminary planning as had been taking place to increase the capacity of the Scunthorpe purifying plant. The integration of group works with the largest undertaking made necessary an appreciably larger installation to purify the then potential output of 4.08 mill. cu.ft. per day.

Because of restrictions upon capital expenditure, recourse was made to the possibility of utilising plant from works in the Board's area, closure of which was known to be imminent. It was decided to take three 40-ft. by 40-ft. boxes from one works, and a fourth from another, to form a set capable of handling 3½ mill. cu.ft. per day; if worked in parallel with the existing stream a capacity of 5 mill. cu.ft. per day would be achieved.

Work on the site began in August, 1955. It was first necessary to remove some 3 ft. of marshy overburden from an area 175 ft. by 60 ft. of the ironstone site. Bank slag to a depth of 12 in. was then hand placed over the whole area, well rolled, and further consolidated with weak grout. Mass concrete was superimposed to a depth of 9 in., blinded to a depth of 3 in., and the upper surface was screeded to a smooth finish. Weather conditions during that autumn were severe and excessive rainfall percolated on the rock shelf to the site in such volumes that the greatest difficulty was experienced in carrying out the concrete works, particularly for the 16-ft. wide by 6-ft. deep pipe trench alongside the main foundation. Indeed, the delays which were experienced were materially responsible for the installation not being ready by the winter of 1956-57 as had been hoped. After a peak day that winter at 10,350 therms the sense of relief with which the new plant was commissioned in May, 1957, can be appreciated.

The second phase was to have as its ultimate object a low pressure supply to all districts through adequate mains with the minimum of reinforcement from boosting plant. Earlier reference has been made to the desirability of laying a new feeder or 'backbone' main through the centre of the distribution system.

In the interests of economy it was considered expedient to make use of the potential gas delivery from the extremity of the 12-in. main involved in the first phase of the low to medium pressure scheme. This meant laying the downstream sections of the 'backbone' main first, operating the whole length at medium pressure, and supplying the rapidly developing suburbs to the south of the town through district governors. The sections in question were fully commissioned in the September quarter of 1955.

Meanwhile, the necessary work on the gas main connections to enable the undertaking to accept the supply of coke oven gas from the new source had made such progress, that it had been possible to cease carbonising temporarily in the March quarter of 1956—since the contract volume was in excess both of the undertaking's ability to purify and to distribute elsewhere. This situation continued until the commissioning of the new purifiers and the installation of the North Lincs. grid compressors, capable of delivering 175,000 cu.ft. per hour at 20 p.s.i. in the September quarter of 1957.

Maximum reached

The branch main to Winterton and Barton was now completed and these undertakings had ceased to carbonise by the end of that quarter. At the same time carbonising recommenced at Scunthorpe, after which that works was able to supply gas to the whole of the group, and any balance of that available to the North Lincs. grid. Total gas made and purchased did in fact reach the maximum of 20,400 therms per day envisaged on the date of signing the new coke oven gas contract.

About this time there were already indications that J. Lysaght Ltd. might be prepared to increase their maximum contract delivery of coke oven gas by 1 mill. cu.ft. per day, and there were two projects of works' development bound up in the trend towards expanding output. These were:

1. Under the best operating conditions the 10-therm producer plant installed in 1951 was capable of supplying sufficient diluent for daily outputs of about 2.5 mill. cu.ft. With a potential output of double that volume, diluent requirements were proportionally increased and so two 30-therm Tully plants (one as standby), complete with cooler/scrubbers were ordered and commissioned in June quarter of 1957. The diluent was delivered into the common stream of coal gas mixed with coke oven gas at the inlet of the purifiers.

2. Station metering was by an original wet rotary drum machine. This was replaced by a Holmes Connersville meter with a capacity 300,000 cu.ft. per hour.

With the integration of the various works of the group as envisaged some six years previously, accomplished—

though achieved in somewhat different form—together with the connection to Kirton-in-Lindsey in the interests of operational economy, the essential elements of an adequate distribution system provided and one manufacturing unit remaining, the stage was set for management to make its most effective contribution in consolidating the work done in previous years by the following means:

1. Raising the overall efficiency of those processes remaining to a works receiving largely unpurified coke oven gas. The earlier indications as to increased deliveries of coke oven gas were realised during 1958, so that the maximum day's output last winter reached 25,485 therms. By the spring of 1959 retorts had become available at the other manufacturing works on the grid, so it was deemed economically expedient to cease carbonisation at Scunthorpe. Since May last year producer gas only has been manufactured there as a diluent for coke oven gas, and a nominal 20,000 therms per day distributed.

Special attention has been given to (a) purification and (b) calorific value.

Incentive bonus

The time taken to discharge and refill one of the No. 2 stream boxes exceeded 325 manhours in order to ensure the three remaining boxes were 'clean' for the period of operation, the frequency with which boxes were changed had to be considerably advanced. An incentive bonus scheme was introduced and the Ransome and Rapier 462 crane, fitted with a 1½-cu.yard. grab, was brought into use for the whole operation. At the same time the oxide capacity of the plant was increased 12% by dispensing with two layers, giving an added saving in grids and hessian. Despite this increase the time taken has been reduced to 112 manhours.

Arrangements have also been made with an acid manufacturer by which spent material is delivered by group transport returning with new. Allowing for fuel and depreciation, a net saving of 20s. per ton has accrued.

The overall effects of these economies has been to reduce the cost of purification per therm of gas made or purchased from .556d. in 1956 to .120d. in 1959.

Control of calorific value has been streamlined by introducing an hour by hour record of the Fairweather town gas 'slave' recorder. A correction factor is applied daily by means of the Boys test. All works Sigma c.v. recorders on producer, coke oven, inlet and outlet holder gases are centralised on a single panel allowing an unobstructed view from outside the building.

The inlet holder Sigma recorder is fitted with the Kent automatic c.v. controlling unit, which actuates a pneumatic servo attached to the producer gas exhauster by-pass valve. Since the c.v. of the incoming coke oven gas is quite stable, the time lag problems often associated with this form of automatic control seldom arise.

2. Instituting a straightforward system of planned maintenance for both mechanised and electrical equipment. Although economies are not immediately forthcoming, there is no doubt that information collected will provide reliable data for the future.

The principles have already been adopted for the servicing of group transport, and supplemented with a visual aid board such that each engine condition can be predicted.

3. The streamlining of the labour force and injecting the right kind of manpower is a singularly difficult problem in a highly prosperous industrial town where some 90% of the working population is absorbed in the steelworks. However, the closure of two manufacturing stations in the division, and the temporary steel recession provided the opportunity. By building up a measure of goodwill and confidence through the medium of Joint Consultation and example, a process of selection over a period of 12 months has resulted in a small but very efficient force of craftsmen and shift personnel being assembled; it is supervised by shift foremen who carry responsibility for out of day hours maintenance of gas quality and purity records.

4. Providing a distribution service fulfilling the basic requirements of adequacy for each and every consumer, the supply being assured with the minimum of boosting and backed by sound planning of mains and service renewals. The upstream section of the local reorganisation scheme in which 2,460 yards of 24-in. main were laid from the works to the Queensway roundabout was completed in the September quarter of 1958. Since then the whole of the Scunthorpe district has been supplied through a new 24-in. relay type station governor; facilities are provided for boosting at the inlet when the three lift town supply holder is down to the inner lift.

The stability achieved has contributed substantially towards an overall reduction over two years of 2.82% in unaccounted for gas. In addition there has been: (a) A leakage survey, carried out in 1958 using the explosimeter, which covered a distance of 124 miles and traced 191 leakages of 2 cu.ft. per hour, accounting for a saving of about 3.346 mill. cu.ft. per annum. (b) The reconstruction of the two-lift spirally guided ½-mill. cu.ft. No. 1 gasholder built in 1922. Storing largely coke oven gas, this holder had suffered considerably from internal corrosion. It was rebuilt at a total cost of £38,348 to modern design which increased the pressure thrown by 60%; it was recommissioned in the December quarter of 1958.

'First aid' repairs had been carried out upon the No. 1 concrete purifying installation, so as soon as possible after commissioning of No. 2 installation, comprehensive repairs to the older set were put in hand. The inner walls of each box were thoroughly hacked or sparrow pecked and 4-in. by 4-in. eight-gauge steel fabric was fixed; Gunite rendering was then applied to a depth of 2 in. The total cost of this operation, including minor civil engineering work, the provision of ten new gas valves and the overhaul of the air/steam services, was £3,865.

5. Strengthening the connections leading up to the most effective sales impact upon existing, new and potential consumers of all categories.

Appliance 'short list'

In order to sell and given adequate selling service, *i.e.*, provide the goods if not immediately after, then certainly within the shortest possible space of time after the sale, it is important that stocks should be available. These are governed by storage space and consumer demand and to a greater or less extent by the financial stringency of the time. Some co-ordination has been possible by introducing a short list of appliances comprising eight water heaters, 11 space heaters, seven home laundries, ten cookers and four refrigerators. These items are first and foremost on display, take priority in advertising and are special features in campaigns; they assist the sales staff in concentrating on a sales method and most importantly ensure a quick turnover.

Thus at Scunthorpe it has been found that the factors which determine the limits of elasticity relative to stocks of fittings and appliances approximate to 200 sq.ft. of floor space and £400 of stock per 1,000 consumers respectively. Likewise it would appear that the same stock to appliance sales per annum ratio is of the order of 1:12.

Regular meetings of sales personnel are held and always before any specific sales effort. The method of attack is

agreed, each salesman is encouraged to contribute such recommendations as would appear to him appropriate to the particular sales routine. Since from eight to ten campaigns are held annually and in the main planned to coincide with season consumer demand, sales personnel can, from their special knowledge, often indicate districts likely to give the best return from an initial softening up process based on leaflet distribution and local advertising mediums.

In fostering the expansion of gas sales in a district growing rapidly residentially, but where industry and commerce are largely composed of an intense concentration of steel production and fabrication, management and its representatives have made it their duty to move in those trade and cultural spheres with which business men and tradespeople of the town are most associated; a much fuller understanding and appreciation of local processes is so gained. It should not be forgotten that despite the tendency towards large production units, the sales ground of our industry is still very 'parochial' and upon it the largest percentage of our consumers undertake their business.

The following instances show how successful our policy has been:

1. There are 4.35 gas points per house in all domestic properties being erected by private builders and local authorities.

2. Gas-fired boilers and space heaters with a total rating of 6.58 mill. B.t.u. per hour have been installed in shop premises of the local High Street.

3. In one foundry where hard coke has been displaced by gas in the last two years, three mould drying furnaces with an average individual consumption of 3,500 cu.ft. per hour, three rotary steel converters each of 1,000 cu.ft. per hour and four ladle drying units each of 1,000 cu.ft. per hour are in regular use.

Job progression

These facets of our sales organisation are supported materially by a control office equipped with a 6-part job voucher system for the recording and progressing of all service demands. The system not only ensures a job being efficiently progressed through the usual channels from issue through stores and transport to completion, with subsequent billing, but facilitates supervision by the responsible staff—a reduction of 7.3% in unproductive time has been achieved,—provides the consumer with a record, and the office with a permanent street register of consumer activity.

6. Building up a group organisation with personnel having clearly defined responsibilities, receiving full scope for initiative, and drawing encouragement from the guidance of senior officers acting in the course of such of their duties as are part of management.

Here again the local manpower situation is reflected in the high percentage—35%—of female personnel. With adequate departmental supervision output of the latter is nevertheless good, as is to be expected in a town where there is healthy competition for graded posts. This is evidenced by the fact that group consumers over the period covered by this paper have increased to 22,047 and to mention but one item—700 H.P. accounts have grown to 6,000. There has been no increase in the number of accounting staff over that time.

Machine accounting was introduced in 1957, in the first instance to deal with hire purchase accounts—prepayment records and finally credit gas accounts were subsequently mechanised. One Burroughs Sensimatic machine successfully deals with some 6,000 H.P. accounts, 4,000 gas accounts, and the records of 18,000 prepayment consumers each quarter.

Thus by evolving a compact accounting unit and introducing a measure of mechanisation, considerable economies have been realised and a very real reduction in the cost of accounting services per consumer achieved.

DISCUSSION

Mr. W. A. Pask, Grimsby, said that there had been unusual problems to be faced at Scunthorpe. He asked where else could a town be found which had increased its population by 20% in the short space of three years or an undertaking in which the manufacturing policy had been changed by the pressure of events, from coke oven gas and continuous verticals to coke oven gas and horizontals, and then to coke oven gas only, all in ten years. At the same time, gas volumes handled at the works had changed from the equivalent of about 5,000 therms per day, to about 21,500 therms per day. Such changes in the type and volumes of gas to be handled must have raised some interesting problems at the works—for example, wet or dry purification—and he wanted to hear more on this aspect of the problem.

For many years prior to vesting, the Scunthorpe undertaking had taken good, cheap coke oven gas in quantities that at that time had appeared comfortably adequate for the future. If the general condition of the works plant was therefore to be viewed in this light, it would be easier to understand Mr. Stokes when he said that the continuous vertical plant had been in an advanced state of deterioration, the flooding of the works had been a matter of periodic repetition and considerable leakage had been taking place from the dry purifiers. The need for an immediate 'first aid' phase, as Mr. Stokes had so aptly named it, had been indeed pressing. Some of these 'first aid' measures had been novel; for example, the manufacture of a producer gas plant from a 24 in. by 12 in. C.I. tee was one of those ideas that gas engineers docket away in their minds for future use, but Mr. Stokes gave no performance data. It was probably unfair to mention this particular point.

In December, 1955, as a result of the death of the local manager at Caistor—a one-man works scheduled to receive bulk supplies on completion of the grid—he had spoken to Mr. Stokes on the telephone, and in a matter of days, the electrically-driven compressor referred to on [p. 9] had been obtained and installed, and by making certain temporary connections at Caistor, a bulk supply had been made available.

Special requirements

Since the North Lincolnshire grid had been in operation, Mr. Pask, as grid controller, had on many occasions had to call on Mr. Stokes to adjust his programme in various ways to meet special requirements, and on every occasion, he had had but to ask, to see his requests take effect immediately.

There were many sections of the paper that aroused interest and about which he would have liked more information; for instance the dry purification arrangements, the changes Mr. Stokes had made resulting in the major reduction in man-power and costs shown on [p. 13], the rearrangement of the distribution system, and the economic considerations that led to the final decisions. There were also the changes made in the sales and service department, and the effect of one factor he had not mentioned, namely his dependence upon contractors for a major portion of his gasfitting work. These and many other questions arose, but time did not allow so detailed an examination.

Mr. F. A. Rhead, Peterborough, asked Mr. Stokes whether he had any estimate of the amount of condensed

steam diluting the liquor caused by the use of the steam injector for introducing producer gas, a gas of which he is making very considerable use. Though unaware of the actual condition of the gas at the point of admission, it did seem that some form of exhauster might be advantageous, particularly since gas works effluent disposal was normally a major problem.

Dry purifiers were always of great interest, and Mr. Stokes had been able to reduce the man-hours for charging and discharging a purifier box from 325 to 112. In addition to the adoption of an incentive bonus scheme he had used a Ransome & Rapier crane. But if this crane was not used for any purpose other than the handling of oxide, clearly all the costs of operating the machine must be charged to purification. Even if it had alternative uses the apparent saving of costs through reduction of man hours would not be achieved. However, since Mr. Stokes unfortunately only had sets of 4-box purifiers in each stream, time was a very essential factor and hence the use of the crane seemed to be justified.

Since Mr. Stokes had increased the effective depth of the boxes and hence their capacity by 12% by the simple expedient of dispensing with one oxide layer, the use of the crane would be a distinct advantage. How much, he asked, had the back-pressure been increased as a result.

Intriguing idea

Mr. Stokes' idea of a string diagram to ascertain when a box needed changing was intriguing, and presumably the dates were determined by its use and not by strict adherence to a plan, but Mr. Rhead wanted some details of the pre-sampling system used for oxide. His own experience was that the oxide at or near the surface was often no guide of the average contents of the box.

In connection with the Barrow to Barton link-up scheme —a village of 120 consumers had been supplied direct by a district governor—he asked whether a safety governor had been fitted to cover any possible failure of the district governor.

Mr. Stokes had done well to remind them of the very serious effect of small leaks on a distribution system. In 124 miles he had found 191 leaks, each of which, estimated at 2 cu.ft. per hour, had meant a loss of nearly 3½ mil. cu.ft. of gas per annum. He asked whether Mr. Stokes could give any indication of the cost of this survey.

Mr. Stokes, replying, said that the labour employed at the Scunthorpe works consisted of a shift foreman and three men per shift in addition to day-work men. Referring to the use of steam injectors for producer gas, he said that in actual fact standard air blowers had been fitted as used in the Tully plant, capable of generating a pressure of 40-in. w.g. at the inlet of the volumetric governor on the air main to the producer. This pressure was reduced to 3 to 4 in. w.g. underneath the grate. Steam was only introduced under the grate to maintain a safe working temperature.

In answer to the question why 4-box purifier sets had been installed in preference to 5-box sets, he pointed out that with daily rotation the first taker could be kept clean and so there was little point in incurring the extra expenditure of the bigger installation, and its capital cost was naturally lower.

Presampling of the oxide in the box was carried out by extracting a sample with a hollow probe pushed into the full depth of the oxide through a valve in the cover of the purifier box.

Referring to the loss of gas by leaks and the cost of the survey carried out, he said that no figures were yet available.

Mr. G. Hall, Chelmsford, referring to [p.14], asked for further details of how maintenance costs were arrived at, what was the manpower breakdown and whether men doing outside work were included. He also asked about coke and by-product deliveries.

Mr. Stokes, said that the scheme needed an inspector to go round and examine the work to be done and to see what was necessary. An index card was then given to a fitter on which were the full details of the job to be done. It was important that maintenance did not get top heavy for a small output of gas. The grid system was now in operation and all maintenance work could be carried out in accordance with the manufacturers' directions.

Since there was no coal being carbonised at Scunthorpe at present the only coke being sold was from the stock that still remained.

Mr. R. R. Mortimer, March, said that an account of one engineer's trials and tribulations did help others to grapple with their own. Though it was difficult to comment on an account of work successfully carried through without appearing hypocritical he had a few queries and comments which he would like to put forward.

On [p.5] in the quenching water re-circulating system, the author had used electrically driven centrifugal pumps. At March the quenching water had been circulated from W-D continuous vertical for some 13 years. In the first year or two, there had been considerable difficulty in finding a pump which would handle this water, even after adequate settlement, without excessive wear. The problem had been solved some 11 years ago by the use of 'mono' pumps which had proved more than satisfactory, and maintenance had been extremely low. He asked what were Mr. Stokes' experiences with the centrifugal pumps since this particular type had been one of their most spectacular failures.

On [p.5] the waste heat boiler at Brigg appeared to have suffered from a general malady, namely the scaling of the inlet tube plate. Using water from a base exchange softening plant he had also found this plate scaling up over a period of years. Possibly in a case such as this, lime soda softening was to be preferred, but with base exchange plants a compromise had to be arrived at. When water of zero hardness was fed continuously, blow down was apt to be excessive to keep the alkalinity within bounds, but he had compromised by feeding water at about 3° to 4° hardness and added Calgon phosphates to control deposition of scale. This would keep the matter under control.

He asked Mr. Stokes for his experiences at Brigg after the boiler had once more been put to work.

Cheaper system

On [p.10] it was stated that four purifier boxes had been moved to Scunthorpe from another works. Such a procedure has been suggested at Mr. Mortimer's own works but it had been found on investigation to be cheaper to erect new boxes utilising the lids only from the old boxes. Mr. Mortimer asked whether this alternative had been investigated or had there been special circumstances which rendered the removal of the boxes the cheaper method.

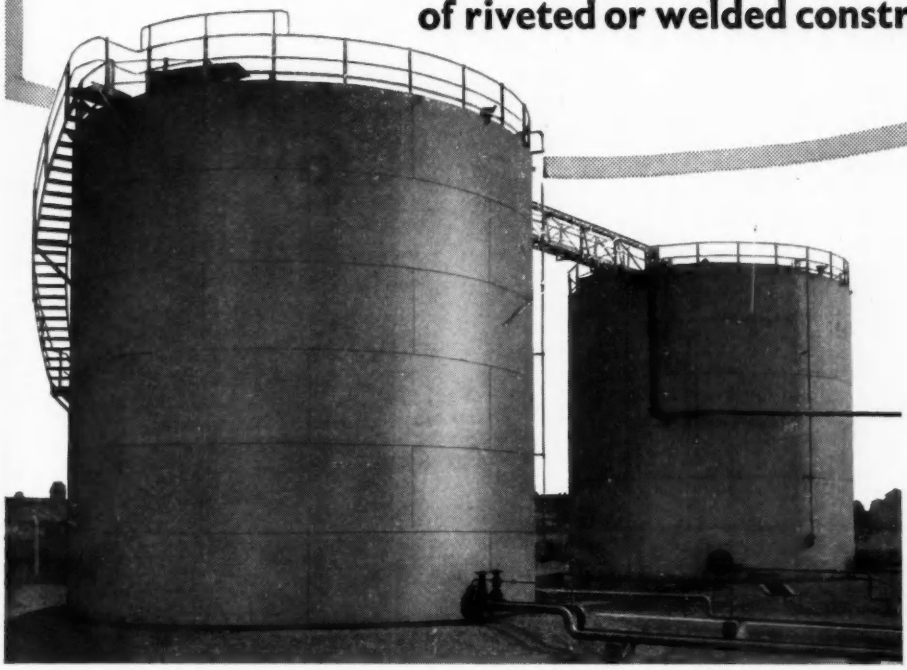
Referring to [p.15] he asked whether the overall reduction in unaccounted-for gas of 2.82% referred to Scunthorpe only, or to the whole group. If to Scunthorpe only, another factor would certainly be the increased send out over the period.

Referring to percentages, he asked how did the actual volumes of unaccounted-for gas compare over the two years in question.

Finally Mr. Mortimer asked what had been the effect on costs of a practically new carbonising plant lying virtually

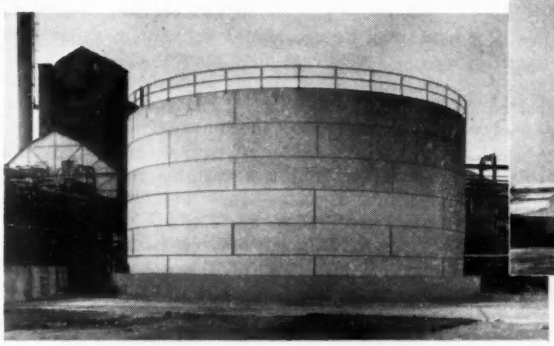
Mild Steel Storage Tanks

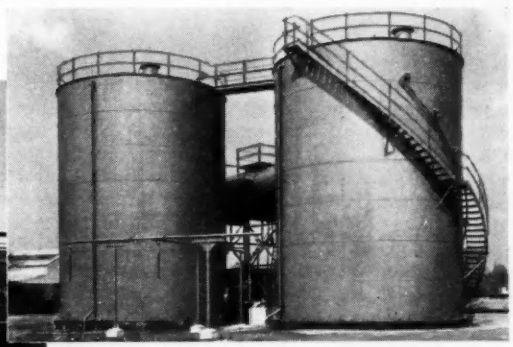
of riveted or welded construction



M.S welded ¾ Fuel Oil Storage Tanks each 35 ft. dia. x 35 ft. high, 200,000 galls. capacity, at Gloucester, for the South Western Gas Board.

500,000 galls. capacity Oil Storage Tank 60 ft. dia. x 29 ft. high, at Southampton, for the Southern Gas Board.





Two Tar and Liquor Storage Tanks, each 25 ft. dia. x 33 ft. high, with welded steel Loading Tank 8 ft. dia. x 26 ft. long, at Camberley, for the Southern Gas Board.

DE DEMPSTER ELLAND

ROBERT DEMPSTER & SONS LTD ELLAND YORKS

LONDON OFFICE: 57 TUFTON STREET WESTMINSTER SWI

idle, since capital involved would have to be serviced, and what had been the effect of this on the economics of the coke oven gas supply.

Mr. Stokes: Recirculation of gritty water could be very difficult indeed and certain measures had been taken to make it possible. First an Arkon filter had been fitted which had shown an immediate improvement. This had been followed by an increase in the speed of the pump which had been fitted with a 60-p.s.i. flexible connection and all glands provided for water pressure loading. There had been, however, a loss of power. After the pump impellers had been sprayed with stellite metal and polished, there had been no further trouble.

The boiler plant at Scunthorpe had worked for three years and continuous blow-down had been practiced. There had been no deterioration of the end plate though strains had been detected on the water tubes near it.

Unaccounted-for gas over the period had been reduced considerably, although the send-out had greatly increased.

Mr. L. H. F. Stanford, Wisbech, pointed out how important the sales force were and asked how many salesmen there were per 1,000 consumers; was an incentive scheme in existence and what use was made of promotional tariffs?

Mr. Stokes: The special tariff in force in the Scunthorpe undertaking's area of supply was 12.5d. per therm with a fixed charge of 16s. per quarter. The undertaking's sales force consisted of a showroom staff of five, three district representatives and two district salesmen, which was equivalent to one salesman for every 3,000 to 4,000 consumers. The only incentive bonus was the East Midlands Board's points scheme, by which each group was credited with so many points and the salesmen must attain the full number.

Mr. L. B. Chapman, Skegness, referred to the sales aspect of the chart on [p. 18] which was highly significant. In Scunthorpe the sales of gas had risen from under 40 therms per consumer in 1951 to over 130 therms in 1959. He referred to [p. 19] and thought that maintenance to appliances should be free since its cost could be well disguised in the price of gas. Free maintenance was valuable in that it inspired in the minds of consumers complete confidence in the undertaking.

Mr. Stokes: The sales of gas per consumer had risen very quickly over the past eight years, and there was no doubt that the Clean Air Act had had its influence. Industrial uses of gas had been expanding; he instanced a local foundry which had begun to use considerable quantities of gas; in fact the industrial consumption had risen from 9½% to 15% of the undertaking's sales in the last two years. Domestic consumption, too, was increasing and its present rate of increase was some 4% per year. Free servicing twice a year was included in the price of the special tariff; contractors were employed for installing space heating appliances. He questioned the wisdom of including maintenance in the price of gas; in the past a charge had been made and had been sustained.

Canadian gas telemetering system—from p. 315

Ltd. The installation was carried out by the gas company's own personnel under the supervision of the gas measurement department. On installation, the system was synchronised, tested and placed in operation by Bristol technicians and gas company personnel, with a central dispatch centre at North Bay, Ontario. Because of the geographical location, the signal transmissions are made over three separate circuits rented from the Bell Telephone Company of Canada. The circuits transmit signals from a number of town gas sub-stations and from two large paper mills and three large plants of International Nickel Company of Canada.

Although the three circuits, employing self-synchronising time multiplexing equipment, are together capable of transmitting 45 signals, the present plans envisage the use of only 32 signals transmitted from 16 points. System expansion is under study and will be based on growth requirements. Studies are also being made for remote control on transmission lateral lines and regulator stations supplying the distribution system. This remote pressure control system can be adopted very readily at a nominal cost to the existing telemetering system with complete pressure control from the central operations room. The 19 small towns which do not have major industrial loads have been omitted from the present telemetering circuits since the purchased pipe-line gas can be accurately projected in the case of these without the assistance of telemetering.

With the electronic 'listening-posts' installed at key points throughout the gas distribution system, impulses representing information on gas consumption in each of their respective areas is automatically relayed to the central data-gathering point at North Bay, where area-wide records are kept on charts. There, a three-man operations crew, on duty day and night, takes readings every hour.

Each of the transmitter installations consists of a Bristol static pressure indicating transmitter with a range of 0 to 1,000 p.s.i.g., a Bristol differential pressure indicating transmitter (mercury monometer type), a Bristol multiplex transmitter with relays and power pack. This equipment is mounted in an insulated and heated steel case installed over the meter run of pipe.

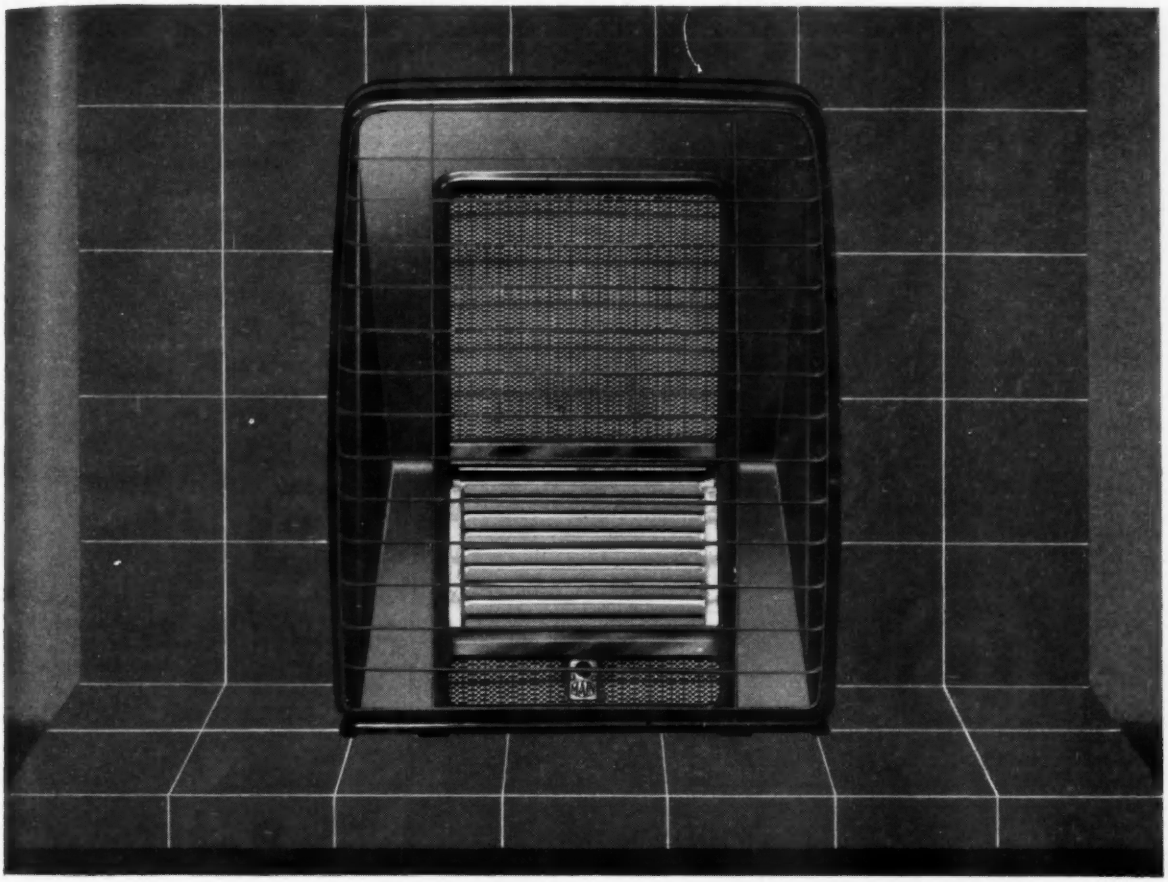
At the central operations room, the dispatch receiving panel is constructed in three sections of ¼-in. steel plate, welded to a self-supporting angle iron frame. The entire panel has been painted mist green with the centre section displaying a colour map of the entire system. Pilot lights on the panel flash to indicate the location of the towns and the static and differential pressure signals as each transmitter functions. The Bristol dual (2-pen) receivers mounted in the wing sections of the receiving panel record the static and differential pressures on 12-in. circular square root charts at 5-second intervals. The dispatch receiving panel has been designed for system expansion envisaging up to 27 receiving instruments.

Gas purchased from the pipe-line at pressures ranging from 600 to 920 p.s.i.g. has to be pressure-reduced down to the normal distribution system pressure of 10 p.s.i.g. The pressure reduction equipment can be visually supervised at the central operations room at North Bay and the transmission of static pressure readings has proved invaluable to all phases of the system operation. The operator on duty can detect system failures in the advance stages and send out men and equipment to remedy the fault, thereby eliminating the possibility of interruption.

So far, the telemetering system has required little or no maintenance but complete replacement units have been stocked at strategic points so that any defective unit can be replaced and returned to the factory for repair.

If the charts show that gas consumption on very cold days may run above the maximum amount the gas companies have contracted to purchase from Trans-Canada, the large industrial users who have contracted for excess gas are given notice temporarily to curtail their consumption. These retain their alternative heat source facilities and switch from gas back to their original fuel when such emergency occurs.

Main...



present No. 268

THE LATEST

INEXPENSIVE

RADIANT CONVECTOR

- Specially designed for rapid heating.
- Advanced type heat exchanger gives exceptional convection within a few minutes of lighting.
- Efficiency of over 60%, rather more than half the output being in the form of radiation.
- Approved dress guard designed as integral part and covers both radiants and convector grille.
- Easily removed outer casing — held in place by two screws only—simplifies fixing and maintenance.
- Completely silent in operation and lit by flash tube.
- Full-on gas rate when heated, 15,000 B.T.U.
- Finished in Old Silver, Bronze or Gold; cream finish to grilles and chromium plated trims.
- List price £15.9.9 tax paid.

R. & A. MAIN LIMITED LONDON AND FALKIRK

Note the name-made by MAIN

F73

GAS ON THE CONTINENT

Town gas by cracking in Offenburg

SINCE February, 1959, a catalytic cracking plant working on the Klönne principle has been supplementing the Offenburg system by 12,500 cu.m. per day. The plant is designed to primarily use liquefied gas, but it can also use other light oil or paraffin products, whichever is the cheaper. The liquefied gas passes through a preheater and an evaporator, taking heat countercurrent from the gases leaving the cracker and then goes through a steam heater and a reducing valve to the supply mains. The cracked gases pass through a scrubber in the same tower as the preheater, before being mixed with uncracked gas.

The patented Klönne cracking unit is heated by a central combustion chamber burning evaporated gas in air supplied by a blower. Steam for the process is provided by a waste heat boiler with auxiliary gas firing. A steam-operated air injector sucks air through a heat exchanger, where the air is heated by the cracked gases and supplies the hot air/steam mixture to the cracker.

The Klönne cracker comprises a number of cracking units, each with an associated heat exchanger, which are connected through valves to ring mains. The cracking unit and heat exchanger are both of compact concentric tube design. Insulated roof segments and doors, with a jib-crane above, permit cracking units to be removed without shutting down the whole cracker, so avoiding the cost of a spare cracker.

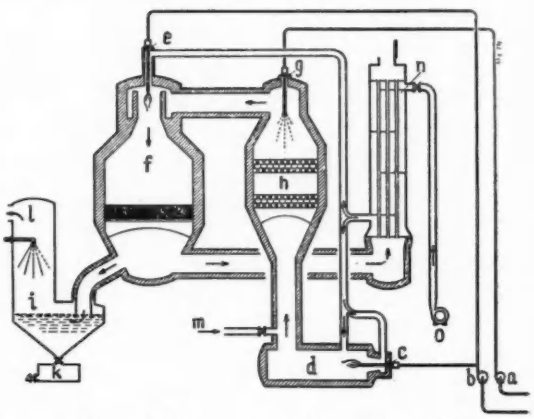
The central combustion chamber can be easily replaced and is fired with either gas or a liquid fuel. It is important for this type of catalytic cracker that the hydrocarbon gas is supplied truly vaporised. Hence, when using hydro-carbons other than liquefied gas, a preparation plant is necessary. This consists of a simple distillation column followed by treatment with steam and a carrier gas, namely, hot cracked gas. The heaviest residues of distillation are used for firing the combustion chamber. A careful layout of control has enabled this plant to be operated by one man per shift. K. Müller, *Schweizer Verein von Gas- und Wasserfachmännern* 1959, **39**, 261.

Quick starting plant for demand changes

THE daily and seasonal variations of gas demand cannot be met by large and bulky gas holders; what is essential is a quick starting plant having a small initial outlay to cover the variations in demand. Such a plant is that developed by the French firm Onia-Gegi to crack mineral oils, now licenced to Demag. Some 61 units are in operation on this process in many countries and a further 40 are in construction.

The cracking process uses a nickel catalyst, which acts also as a heat storing matrix. The cycle of operations is in two main parts, cracking and reheating of the matrix; the cracking process which is endothermic, takes its heat from the catalyst matrix. Waste heat during the re-heating process is used to preheat the air for the heating process or to produce steam for the decomposition process. The layout of the units of the plant at the Berlin-Mariendorf gasworks can be seen in the diagram.

Since steam at 50 p.s.i.f. is already available, the waste heat is used for air heating only. The catalyst is in the form of a special heat resistant ceramic material, activated with nickel and other additives. Oil is sprayed in at *g* and the steam required for the process at *m*, so that it is superheated in the matrix *h* before meeting the oil. In the decomposition process besides the desired gas, benzene, naphthalene, tar and carbon are also produced. The carbon, which is deposited on the catalyst is partly removed by conversion to water gas by continuing the supply of steam alone for a short period after the end of the cracking process, thus increasing the efficiency. It is to be noted that the cracking oils have excess carbon for this process, e.g., the C:H ratio of brown coal tar is 8.3, of heavy oils 7 to 8, or gas oils 6 to 7, etc., while coke oven gas has a ratio of approximately 2.2. The carbon which is not converted in the water gas reaction is burnt off in the reheating process. Tar is deposited in the washer and removed by the tar lock.



Schematic diagram of oil cracking plant.

a cracking-oil pump	*h steam super heater*
b heating-oil pump	*i bath*
c burner (1)	*k lock*
d combustion chamber	*l spray washer*
e burner (2)	*m reaction steam*
f decomposition vessel	*n air preheater*
g cracking-oil spray	*o air blower*

The gas leaving the plant passes through an electrostatic precipitator to remove the last traces of tar, an indirect cooler which is rinsed with a mixture of ammonia liquor and tar to avoid plugging with naphthalene, and finally to a holder, where it is mixed with the coke oven gas.

Some two thirds of the sulphur in the original cracking oil is deposited on the catalyst, later burnt off in reheating. The reheating process is carried out by supplying hot tar to burner *c* in the combustion chamber *d*. A separate burner *e* is also provided having its own secondary air supply to allow of more accurate control of catalyst temperature, to suit the oil being cracked. The gases leaving the catalyst pass through the recuperator to the chimney; by careful control these exhaust gases are smokeless. The control of the plant is by hydraulic power. *Otto von Neudeck. Gas-Wärme*, 1959, **8**, 154.

THE SEVEN-YEAR TARGET

GAS INDUSTRY FORECASTS DEMAND WILL RISE 9%

NEWS SUPPLEMENT

THE Gas Council has forecast a rise in the demand for gas of 9% during the seven years which began on April 1, 1959. In a new publication called *Gas Looks Ahead* the Council anticipates that most of this increase will be in the development of industrial supplies.

It states: 'The industry estimates that the sales of gas will have increased to 2,839 mill. therms in the year 1965-66 from 2,605 mill. therms in 1958-59 and 2,328 mill. therms in 1949-50. . . . Over the past ten years industrial sales have expanded by 30% and for the period under review this rate of expansion is forecast to continue.'

Capital requirement of the gas industry is likely to be £370 mill. for the seven years. Expansion plans for the period will entail net new borrowing of £114 mill. after taking into account depreciation and other internal resources amounting to £256 mill.

Reduced borrowing

The new booklet shows that borrowing during the ten years ending March, 1959, came to £324 mill., or expressed as a percentage of capital investment 70%.

But in the period April, 1959, to March 31, 1966, it will be only 32%.

A Government Gas Bill, published last Thursday, raised total borrowing limits by £50 mill., and by subsequent order of the Minister of Power, Mr. Richard Wood, to £525 mill.

The Council's booklet maintains that for many years coal will be the nation's major source of fuel, of which it is the most efficient user.

If all current developments fulfil their promise, the future pattern of gas supply may be a few relatively large gasworks, near coalfields or oil refineries, gasifying a range of small coals and all fractions of oil at high pressure.

National grid

This gas would be fed into arterial mains—a national grid system—which could also take surplus gas from coke ovens, gas still made in some conventional works, and gas produced from liquefied methane.

Although a long-term project, 'preliminary investigations suggest that overall economies would be achieved,' says the booklet, 'the Council is now undertaking an intensive study of the technical and economic aspects of a national grid in relation to new methods of production and supplies of gas.'

The Times, commenting on the fact that the industry proposes to finance two-thirds of its capital investment in the next six years out of internal resources, says: 'The change is welcome, and gives some promise that the industry will have good internal reasons to avoid some of the needless lavishness which has characterised some of the electricity industry's expenditure.

'The Minister emphasises that the investment programmes will be reviewed annually, and Parliament is likely to have another opportunity of discussing the industry's borrowing powers within three years.

'While it is desirable that investment plans should not be too volatile, this is an industry where the pace of technical innovations is likely to require frequent reviews of programmes.'

Past and forecast sales of gas

Class of Consumer	Actual sales 1958/59	Forecast 1965/66	Percentage Increase
	Mill. therms	Mill. therms	%
Domestic	1,308	1,355	3.6
Industrial	770	916	19.9
Commercial and other	527	568	7.8
Total..	2,605	2,839	9.0

FRIDGE FIGURES SHOW NO SIGNS OF FREEZING UP

THE DOMESTIC REFRIGERATION DEVELOPMENT COMMITTEE states that sales of domestic refrigerators run by gas, electricity, bottled gas and paraffin during 1959 reached a home and export total of 945,360.

Sales on the home-market reached a total of 849,362—an increase of just under 100% on 1958, the previous record year, and of more than 160% on 1957.

The domestic sales figures are:

1957	...	256,414
1958	...	448,646
1959	...	849,362

January, 1959, sales were 250% up on the previous year. Month by month records throughout the year showed an average increase of 100% and a new seasonal pattern of steady sales for the domestic refrigeration industry, which up till now has had to plan for a peak summer demand followed by a severe drop in sales during autumn and winter.

Pipes exhibition sponsors double stand space

WHEN the sponsors of the first International Pipes and Pipe-lines Exhibition, which is due to be held at Earls Court, London, from May 30 to June 2, first publicised their intention to hold this exhibition they had reserved a hall giving 14,000 sq. ft. of stand space.

But, in view of the support that resulted, the area had to be increased to 23,000 sq.ft. of stand space. This area, too, was rapidly filled by the reservations of both British and overseas exhibitors, and the total area of stand space has had to be increased once more to 28,000 sq.ft.—double what was originally planned.

Besides a large number of exhibitors who will be showing different types of pipe materials, many stands will show important ancillary equipment such as insulation, protection, testing and welding equipment, as well as fabricated pipework, pumps, valves and fittings.

Scientific Surveys Ltd., of 97, Old Brompton Road, London, S.W.7, plan to send many thousands of invitations to executives and engineers in every class of industry in which pipes are used.

Police witness Gas Board's assault on vehicle fumes

From left: Mr. G. E. Blundell, Assistant Materials Handling, Transport and Coal Manager; Mr. W. N. Wilson, Chief Constable of Portsmouth; Mr. W. F. Young, Meter Repair Shop Supervisor, Bourne Valley; Police-superintendent F. A. Brown; Mr. H. M. Lawrence, M.T.C. Manager; and Mr. C. Giles, mechanic, Bourne Valley.

THE Southern Gas Board's Materials Handling, Transport and Coal Department, under the supervision of its Manager, Mr. H. M. Lawrence, have been working hard to beat the nuisance resulting from dirty exhausts which can arise when operating diesel-engined vehicles.

To show how successful their efforts have been they invited an audience, including the Chief Constable of Portsmouth, Mr. W. N. Wilson, and Police-superintendent F. A. Brown, along to Hilsea gasworks recently to see tests which included the use of a Hartridge Smokemeter, an Injectester and a compression testing motor manufactured by Dunedin Engineering Co. Ltd., in conjunction with a heavy diesel vehicle.

Workshop routine

Mr. Lawrence explained a routine laid down for central workshops where all fuel pumps are removed from vehicles annually for recalibration and phasing, and all injectors are removed at six-monthly intervals for overhauling.

At central workshops, situated at Bournemouth, a fuel injection inspection and repair shop has been installed and the equipment includes a Hartridge electronic test bench for pump testing and all the necessary jigs and tools for the complete overhaul of these units. The shop is also fully equipped for the overhauling of all types of injectors.

Among the invited audience to see the demonstration at Hilsea were Commander G. Kingford, Chairman of Portsmouth Ratepayers' Association; Mr. D. Cameron, a technical expert of the C.A.V. Company, and Mr. A. G. Atfield, representing Dunedin Engineering Co. Ltd.

Ethylene plant for Iron Curtain country ex-U.K.

HUMPHREYS & GLASGOW LTD., in association with Petrocarbon Developments Ltd., are to provide for the chemical industry of the German Democratic Republic an ethylene plant with a capacity of 40,000 tons per annum.

The order for the design and detailed engineering of the first phase of the project was signed in London last month by representatives of the East German foreign trade enterprise *Dia-Chemieausrüstungen* and the British companies, and work will commence at once. The first phase is due for completion in December, 1962.

Know-how and design

This is a notable milestone in the history of British chemical engineering, as it will be the first time that British companies have provided both know-how and design for a plant of this type outside the United Kingdom.

It is also the first time that British companies have obtained a contract for a complete chemical plant for Eastern Germany, whose chemical industry ranks second, among the Eastern countries, only to that of the Soviet Union.

Trade Agreement

This contract is part of the vast expansion programme of that industry, and is one of the first results of the recently-signed 1960 amendment to the 1959 trade agreement between the Federation of British Industies and the Chamber of Foreign Trade of the German Democratic Republic.

Council postpone health scheme after residents warn

SOWERBY Bridge Urban Council has refused to confirm a minute of the health committee that the proposed plan to introduce a smoke control area in New Road, Sowerby Bridge, be submitted for ministerial approval; instead they have passed an amendment by 12 votes to nine that the scheme should not be considered for another year.

A petition had been received from 192 residents in the area saying: 'We utterly refuse to be the subjects of your experiments and shall resist all attempts to put it into operation.'

Councillor George Benbow, chairman of the health committee, warned that if they vacillated and shirked their responsibilities they would 'perhaps be reproached by future generations.'

But Councillor Charles Maude, who proposed the 12-month deferment, referred to 'awful misrepresentations' on this subject. It had been stated, he alleged, that the district was in a 'black spot,' but that was not true.

It had also been drummed into councillors that it was a compulsory Government Act, but it had been admitted to him by one member of the Health Committee that it was, in fact, a permissive Act.

He declared: 'It has been said that an Englishman's home is his castle, but in Sowerby Bridge an Englishman's home is the happy hunting ground for health committee officials and members of the Gas Board.'

U.A.M. GROUP RESULTS

Universal Asbestos Manufacturing Co. Ltd. recommends a final ordinary dividend of 1s. 1½d. per share less tax for the year ended September 28, 1959. With the interim of 4½d. already paid, the total of 1s. 6d. per share compares with 1s. for last year. Consolidated profit for the U.A.M. group increased to £533,265 (from £335,237), tax taking £219,465 (£183,304).

CENTRAL HEATING APATHY

ALTHOUGH 41 out of every 100 middle-class families think central heating the best form of heating for living rooms, only seven actually have it. And only another seven have seriously considered having it installed in their own homes. This is the conclusion of a report prepared by Odhams Press research division for *Ideal Home*. 'The middle-classes need to be much better informed about the merits of central heating before any widespread acceptance of this idea becomes possible,' states the report.

REPORT POINTS CAMPAIGN NEED TO 'EDUCATE' MIDDLE-CLASSES

It suggests that any educational campaign would have to satisfy the public that: (1) Central heating is not the prerogative of the very rich; (2) its installation would not involve major structural alterations to an existing home, (3) running costs compare favourably with other forms of heating, and (4) central heating is not necessarily unhealthy.

Method percentages

The report states figures of heating methods at present used.

Coal fires are by far the most general for living rooms, being used in 73% of middle-class homes, with electric fires and heaters used in 10%.

Other figures claimed are that electric fires and heaters are used in 50% of bedrooms, and gas fires in 16%. For halls oil heaters (30%) are the most general, followed by electric fires and heaters (15%).

Water is heated, in winter, by back boilers in 34% of middle-class homes, by free-standing boilers in 33%, by gas heaters in 14% and immersion heaters in 10%.

Approximately half possess two methods of heating water so that in summer immersion heaters are chiefly relied on by 52%, gas heaters by 19%, free standing boilers by 12% and back boilers by 8%.

Central heating and water radiators are used in 7% of middle-class homes for living rooms, 5% for bedrooms and 11% for halls; 5% of water heating systems are connected to a central heating installation.

The report is concerned with attitudes to central heating and with discovering why, despite its advantages being widely appreciated, the level of ownership is so low.

The major criticism of central heating, expressed by 30% of those without it, is that it gives a stuffy or unhealthy atmosphere; 10% thought it made dirty marks on walls or decorations; 4% thought it would make a house too hot; and 9% would miss 'a cheerful fire.'

Nearly all other objections to changing over to central heating were related to cost and difficulty of installation.

People were asked how much they thought it would cost to install central heating in their homes. Estimates varied very widely and 23% could not answer the question at all. The average figure suggested was £225.

Fear of expense

As many as 45% had no idea how the running costs of central heating would compare with their present methods, and 26% thought they would be higher.

That installation would be a messy job is the belief of 67%, and 24% thought this would put them off having central heating.

BRITAIN'S FIRST FULLY-CONTINUOUS BENZOLE FRACTIONATION UNIT

A NEW continuous benzole refining plant, designed and constructed by the A.P.V. Co. Ltd., chemical engineering division, has been put on stream at the Scunthorpe coke oven and chemical plant of Appleby-Frodingham Steel Company (branch of the United Steel Companies Ltd.). This plant is the first in Britain to produce nitration grade boiling range benzole and toluole, 2° xylole and 160/190° naphtha continuously from crude coke oven benzole. The design throughput is 5½ mill. gal. per year. A striking advance in the benzole refining field is the operation of five continuous fractionating columns in series.

In a test run it was established that at a throughput rate of over 650 gal. per hour of crude benzole the refinery produced the above products with a steam consumption of less than 11.8 lb. per gal. of crude. Subsequent operation shows a considerable reduction in this figure.

The refinery incorporates the new APV continuous defronting unit which is capable of producing defronted benzole containing as little as one part per million of carbon disulphide sulphur with a very low loss of benzene in the overhead fronts.

This is the second benzole refining unit supplied to the Appleby-Frodingham Steel Company by APV. The first, erected in 1940, processed over 38 mill. gal. of crude benzole and has now been superseded by this latest plant of twice the original capacity.

General view of the new benzole refinery

Built-in cookers plea fails

NO matter whether there are solid fuel cookers in houses, people will still prefer to do their cooking by gas. This declaration came from Mr. John Fisher, a member of the Borough Council in Coleraine (County Derry) when he suggested to the Council that gas cookers rather than solid fuel cookers should be installed in their new houses at Ballycastle Road.

'This Council's gasworks is producing the gas and it is up to us to do all in our power to sell it. Install gas cookers in these houses and we will thus be supporting our own gas undertaking' he added.

But the Council has decided not to install the gas cookers, stating that the tenants could purchase them themselves, on easy payment terms if necessary.

Scale models aid tar oils plant construction

Whessoe handles South Eastern Board contract

A SPECIAL feature in the handling of the contract for a tar oils plant placed with Whessoe Ltd. by the South Eastern Gas Board for Ordnance Wharf is the use of scale models of equipment layout and piping.

The basic design of this continuous process plant for the extraction of tar acids and bases from coal tar fractions is by the Gas Board, while engineering design, procurement and erection are being dealt with by Whessoe.

A small scale model was used to obtain quick decisions on layout and spacing, in consultation with the client. Details of units and buildings were worked out and a large scale 'piping model' has been made.

View of the tar oils plant model, showing a section of the pipe-work and tank layout. Scale is indicated by the model of a man in the right foreground.

Will expedite work

Piping diagrams and isometric sketches are used to detail pipe-work and provide information for erection staff. The model will also be used on site to expedite erection.

The extraction of the more valuable constituents of coal tar, such as naphthalene, tar acids (phenols and cresols) and bases (pyridine and homologues) has long been a feature of tar works practice and recent plants are generally of the continuous type.

The tar acids are extracted from the tar oils with 8-10% caustic soda solution, and then freed from the carbolate or cresylate solution by reacting with gases containing CO_2 which regenerates the phenols and leaves sodium carbonate in solution, this process being known as 'springing.' Tar bases, pyridine, etc., are extracted with 20% sulphuric acid and the bases freed with an alkali, soda or ammonia.

The plant under construction handles a benzole fraction, a naphtha fraction, and three creosote fractions, which are products of continuous tar stills All fractions are washed for tar acids, but only the first two are washed for bases, as the market does not warrant recovery of higher bases.

The extraction step is being carried out in a series of counter-current mixer/separator stages, the mixing being performed by a centrifugal pump circulating through a small vessel with the throughput passing to a separator.

The extracted tar acids in soda solution, are purified by a benzole wash and steam distillation and passed to three carbonating (springing) towers in series. The tar acids are separated for sale and the carbonate solutions for recycling.

The bases are extracted in similar mixer separators, 'sprung' in a further vessel with 20% ammonia solution and dried for sale, while the ammonium sulphate solution formed is sent for fertiliser preparation.

For maximum economy, the soda solution is causticised and recycled in the circuit.

Fully instrumental

The plant is fully instrumented with flow indicators, temperature and pressure recorders, etc., and owing to restricted site area, its design has entailed careful positioning of a large number of units and pumps. Consideration has been given to flameproof regulations, accessibility, design of pipe runs, instrumentation and electric cabling.

Sewage engineers bought by Woodall-Duckham

WOODALL - DUCKHAM CONSTRUCTION CO. LTD., the principal operating company of the Woodall-Duckham group, has contracted to purchase the whole of the issued share capital of Ames Crosta Mills & Co. Ltd., sewage purification engineers, of Heywood, Lancashire, for the cash sum of £735,000.

Ames Crosta Mills, which has a world-wide reputation in the field of sewage purification engineering, will continue to operate as an independent unit under its present Board of Directors within the Woodall-Duckham group of companies.

Plans are in hand further to extend its activities in the fields of sewage purification and effluent treatment on a world-wide scale, with the financial and engineering support of the Woodall-Duckham group.

VEHICLE RULE CHANGE

The Motor Vehicles (Authorisation of Special Types) General Order, 1955, has been amended to permit the use on roads of unladen dumpers (or other unladen special vehicles constructed for moving excavated material) of a width exceeding 11 ft., the existing limit, subject to specified conditions. Only vehicles which do not in all respects comply with the normal construction and use regulations are concerned.

APPLIANCE SALES HOPE

Sales of appliances in the current year would exceed £170,000, Mr. J. L. Hyslop, General Manager of the Gas Department, has told Belfast Corporation Gas Committee.

WIGGIN WILL SHOW NICKEL ALLOY USES

HENRY Wiggin & Co. Ltd., are to stage their second 'Wiggin nickel alloys in industry' exhibition at Park Lane House, 45, Park Lane, London, W.1, from March 21—25. [Daily, 10 a.m. to 8 p.m., closing 5 p.m. March 25.]

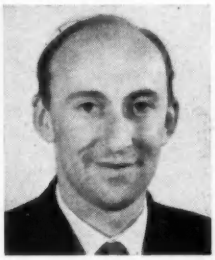
Specialised alloys manufactured by the company fall mainly into four groups: Corrosion-resisting, heat-resisting, electrical resistance, and materials with special properties. The display will include a large selection of actual components, sub-assemblies, and finished parts in which Wiggin materials play vital rôles.

Lectures will include one entitled 'Fabricating the high-nickel alloys,' and a series on uses of high-nickel and nickel-base alloys in the production of nuclear power, in heat-resisting applications, in the electrical and electronic industries and in chemical engineering.

PERSONAL NOTES

THIRD DEMPSTER TRAVELLING FELLOWSHIP

MR. ERIC THORNTON, who is at present Deputy to the Officer-in-Charge of the Industrial Laboratory, Watson House, has been awarded the Third Dempster Travelling Fellowship of the Institution of Gas Engineers. The Fellow will make, during a visit of about three months, a study in one or more Continental countries of methods of increasing the utilisation efficiency of gas in industrial processes. Mr. Thornton, who is 35 years of age, was born at Perth, Western Australia and was awarded a B.Sc. degree in physics at the University of Melbourne. In 1959, he was awarded an M.Sc. degree, by thesis, in the University of London. He has held research appointments in Australia, France and latterly at Watson House prior to his appointment, in January, 1959, to his present position in the Industrial Laboratory there.



MR. J. S. WILLIAMS, O.B.E., has been appointed a deputy director-general of the marketing department, National Coal Board. The post is a new one and Mr. Williams will have special responsibility for sales promotion and development. Mr. Williams is at present Director and Chief Executive Officer of the Coal Utilisation Council.

MR. FRED ILLINGWORTH, sectional head of the coke accounts department of the North Eastern Gas Board in Britannia House, Bradford, has retired after 50 years' service in the gas industry.

MR. PETER WRIGHTSON, O.B.E., Managing Director of Head Wrightson & Co. Ltd. since 1955, has been appointed Vice-Chairman and Managing Director.

MR. H. W. WRIGHT has been appointed Head of the Electrical Department at the head office and works, Tottenham, of Keith Blackman Ltd.

SIR WALTER WORBOYS has been elected to the Board of BTR Industries Ltd. and appointed a Deputy Chairman.

MR. JAMES BAXTER has been appointed Field Sales Manager for the Scottish Branch of Griffin & George Ltd.

MR. S. J. BURTON has been appointed Export Sales Manager of Chaseside Engineering Co. Ltd. Mr. Burton, who before this appointment was an export assistant at the Hertford works, previously spent a number of years as technical sales representative for the company.

COMING EVENTS

February 25.—LONDON AND SOUTHERN JUNIORS: Visit to the Royal Mint.

February 25.—NORTH THAMES G.C.C.: Meter Works, Pound Lane, Willesden, N.W.10. Council Meeting.

March 3.—EAST MIDLANDS G.C.C.: Smithy Row, Nottingham. Council Meeting. 11 a.m.

March 4.—LONDON AND SOUTHERN JUNIORS: 'Developments in Pressure Raising and Regulating Devices' by B. Kemp, Bryan Donkin Co. Ltd.

March 5.—EAST OF SCOTLAND JUNIORS AND SCOTTISH WESTERN JUNIORS: Joint Meeting. Address by the Junior Vice-President of the I.G.E.

March 8.—MIDLAND JUNIORS: Birmingham. 'The Rule of Law' by Mr. A. C. Croasdell, Solicitor to the West Midlands Gas Board. 6.30 p.m.

OBITUARY

MR. HAROLD RICHARD HEMS, who was industrial gas officer of the West Midlands Gas Board from nationalisation until his retirement in 1956, died last Thursday, aged 64. Mr. Hems was born in Birmingham and educated at King Edward's Grammar School. He joined the City of Birmingham Gas Department in 1912, entering a new department which had been formed under Dr. C. M. Walter to foster the use of gas in industry. Mr. Hems played a large part in the development of this department, becoming first manager of the industrial heating section and then, upon the retirement of Dr. Walter, industrial sales manager. Early in the 1930's the gas industry decided to co-operate more closely on industrial gas matters and formed a national committee which eventually became the Industrial Gas Development Committee. Mr. Hems served several terms as chairman of this national body. After his retirement Mr. Hems became a fuel consultant and was appointed a vice-president of the Institute of Fuel, having been chairman of the Midland Section of the Institute from 1948-49. He was a well-known Liberal, unsuccessfully contesting the local municipal elections in 1958 and 1959.

The Chairman of the West Midlands Gas Board, Mr. G. le B. Diamond, writes of Mr. Hems:

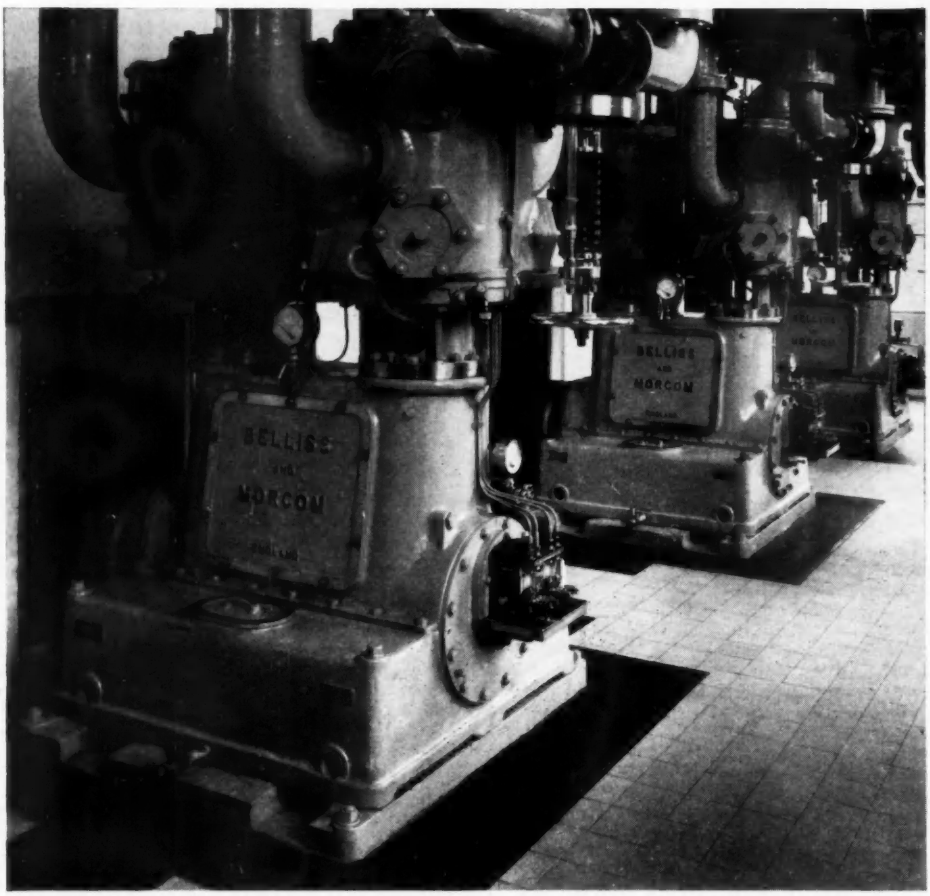
Fearless and forthright in his manner, he fought the battle of industrial gas like a crusade, and there can be no question that the result in the Midlands has been outstanding. Such a doughty fighter cannot expect to find ready agreement with all his views and he was sometimes a little intolerant with those who took a contrary opinion. With it all, however, there was no ill feeling, and his private life was an example to all. He did not take to his early retirement very kindly, but the tragic nature of his passing emphasises the correctness of the medical advice. Happy in his home life, he will be sadly missed by many in the gas industry.

Eastern Juniors see diesels manufactured

The Eastern Junior Gas Association recently visited the Stamford works of Blackstone & Co. Ltd., manufacturers of diesel engines and generating sets. The group toured the Blackstone factory and watched a film entitled 'Diesels in Industry.' They also heard and discussed a paper called 'Applications and Maintenance of Diesel Engines in Industry," read by Mr. G. Hallewell. The visitors and their hosts are pictured above.

"B & M" GAS PUMPING PLANT

THE SAFE AND DEPENDABLE COMPRESSOR FOR ALL GAS BOOSTING DUTIES



SOUTH EASTERN GAS BOARD—Hove Gasholder Station. 'B & M' Gas Pumping Compressors driven through wall glands by 'B & M' Diesel Engines.

'B & M' COMPRESSORS PROVIDE THE ANSWER TO THE NEED FOR RELIABLE AND EASILY MAINTAINED PLANT WHICH WILL OPERATE FOR LONG PERIODS AT A SUSTAINED HIGH EFFICIENCY

COMPRESSORS high and low pressure · DIESEL and DUAL FUEL ENGINES
STEAM TURBINES · STEAM ENGINES · CONDENSING PLANTS
'ARCA' AUTOMATIC REGULATORS

Belliss & Morcom Ltd
BIRMINGHAM 16 · ENGLAND